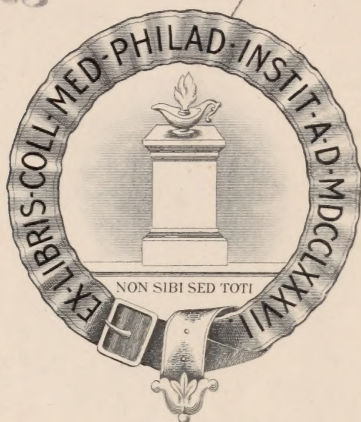




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EDITORIAL.

IN THE YEAR OF GRACE 1912.

It has been the honored custom of many journals in the past, and no doubt the custom will prevail in the future, to sum up at the close of the year the salient features which have marked the progress of art, science and literature. Each department has something to show of an advance that is gratifying; and while some years disclose an amble that is disheartening, some a mincing step that indicates a feebleness of spirit resulting from over-carefulness, some a quickstep that breathes bravery and a dash to reach heights, the red-letter days, no matter how small the type or how washed out the color, are treasured up by us as signs that we are really advancing. What art and literature have accomplished must be read in the journals devoted to the interests of these departments; hence what concerns us here is science in its restricted sense—namely, medical, and to note if what has been accomplished in the matter of ‘discoveries’ is of such a nature that we may well plume ourselves, even though our strut retains the degree of modesty that should characterize all attitudes when sureness is not their hall-mark.

Who can mention the ‘discoveries’ of the year which has just come to an end without at once plunging himself into a cauldron of seething waters out of which no escape whole-skinned is possible? Take, for instance, the ‘cancer cures.’ As is known, every laboratory throughout the world is more or less interested in a cure for cancer, and rightly so; for, if the public has ever demanded the cure of any one disease, it cannot be denied, even by the most obtuse member of the medical profession, that that disease is cancer. Of course, it is most unusual for the public to take up the cudgels in a fight which clearly belongs to medicine; but when so much has been written on a subject and so much magnification has been attached to experiments which should never have got beyond

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the walls of laboratories, is it at all surprising that the public should be guilty (?) of an interest that is so formidable that often, we fear, it is the incentive that drives many good and honest laboratory workers into the limelight of publicity before they are prepared to stand foursquare? That this is unfortunate has been commented on before; but in our criticism of this we should not feel that just because a certain prematurity obtains, whether due to the misplaced cocksureness of the investigator or the exaggeration bestowed by both public and press, the work that is going on in the laboratories is a lamentable failure and that it is nigh impossible for any investigator to discover a better method for combating cancer than is effected by the knife. A certain degree of conservatism is an ornament to any individual or profession, but to howl down a discovery, as was done in the case of salvarsan, by the French, just because a German discovered it; to shout calumny against Dr. F. F. Friedmann because he has dared to effect a new treatment of tuberculosis, which has been described by the press as a 'cure'; to foam at the mouth because every cancer 'discovery' that emanates from the laboratory is not what physicians and the popular imagination think it ought to be, is carrying conservatism to those confines which have always made the Philistine, as pictured by artists and writers, the despicable figure in our social fabric.

But why complain of this attitude toward 'new things' in medicine when the same scepticism, the same misunderstanding is rife in regard to subjects that have been under discussion for too many years to count? Who is at one with his medical neighbor as regards ventilation; who among the elect, or rank and file, in the medical profession has positive views on the subject of whether a bath should be hot or cold, distinguished by the addition of a liberal amount of soap or by the complete absence of this commodity; and what two medical men have ever agreed as to what constitutes normal athleticism? One man like Dr. Simon Baruch thinks that by agitating the air, no matter how tight-closed the windows, the currents are effective in producing that degree of 'freshness' which is desired; another believes the windows must be wide open and that even draughts should be encouraged; still another would rather only one window be opened. And to show to what lengths the subject of proper ventilation has gone, Dr. Robert T. Edwards, Medical Officer for Merionethshire, England, has recently advanced the deep thought that parishioners in English churches are overcome by sleepiness, not on account of the droning qualities of the minister, but on account of the stuffiness of the church. Could humor go any further?

And as to bathing! What two books of recent date are more diametrically opposite in their teachings than Pusey's "The Care of the Skin and

Hair" and Jamieson's "The Care of the Skin in Health"? Pusey is keen on soaps, so keen that the list he gives would rejoice the heart of any manufacturer, whereas Jamieson decries their use and belittles the British mind for still clinging to the delusion that soap is a necessary adjunct to the bath. Both men are figures in the profession, and apparently know whereof they speak, yet the discrepancies between their views are enough to drive even an intensely well-balanced man to the borderline which separates the sane from the semi-insane. And on the subject of athleticism, tell it not in Gath, publish it not in the streets of Askelon!

Thus it can be seen at once just why we invariably put up a stubborn front to new discoveries. If those things in medicine which should have been settled years ago are still assaulting us for solution, is not scepticism, in regard to everything in medicine, the proper attitude to assume? It is, if it is coupled with judgment. But even medical men may not have judgment, or rather may not have enough to overcome their prejudices. And surely prejudices count for something; if they did not, how wan and pale would be our much-vaunted conservatism, how weak-kneed our scepticism! Better, indeed, is that uplift which comes from the power to dare than the smug complacency of critics who think a growl is the final word in all matters.

THE PRESENT TREND OF MEDICAL JUDGMENT IN REGARD TO THE OPERATIVE TREATMENT OF EXOPHTHALMIC GOITRE.

We know little of the pathology of this disease. While most observers agree that the change in the thyroid gland is a part of the picture, nevertheless there is much confusion of testimony as to just what these changes are; and, furthermore, there are those who deny that a specific change in the thyroid tissue is an essential of the syndrome. With regard to the specific functional changes in the thyroid and in other structures, such as the brain, the hypophysis, the thymus, adrenals, lymphatic tissue, our knowledge is still more chaotic, or better, our surmises.

On the clinical side of the question we are in a somewhat better established position, but even here there is some lack of agreement as to the details of the syndrome, and the answers to the therapeutic question have been most divergent.

On the one hand, a large element of the clinical picture is made up of symptoms that may be designated as nervous, and which can be improved by proper hygienic and dietetic treatment; and it has been main-

tained by many that the improvement following surgical interference is either coincident, or is the result of mental impression.

On the other hand, the rationale of the operation is based almost wholly upon a rather evident over-activity in the blood-supply of the thyroid gland and the clinical results following operation. Until somewhat lately quite a large proportion of the medical profession has not been willing to accept the latter part of this evidence as conclusive.

Add to this the fact that, without the exercise of the best judgment and technical skill, the operative treatment is not free from a large mortality, and that successful surgical results are but in a small percentage of cases the restoration to full normal health, it can readily be understood why the medical profession, as a whole, has not accepted surgery in this disease as readily as it has in many other diseases where the indications and the results were less equivocal.

The most potent factor that has held many fair-minded and carefully observant medical men aloof from surgical treatment is the operative mortality already referred to; and it is particularly unfortunate that until repeated disaster has driven the surgeon to a very careful and deep study of every phase of this subject, the operative mortality is liable to cast serious discredit upon the procedure.

It has been the experience, as related to us, by a number of medical men, that at some past period, not content with the results of hygienic, cytolytic serums and other forms of medicinal treatment, they were led on, by the comparatively brilliant results of certain surgeons, to turn for help to their surgical friends only to find that the advice was fatal to their patients. Concluding that any treatment was better than this, these men returned to nursing their patients along; and, in each instance, it was some years before they again began to consider surgery as the best available solution.

But while the medical man was learning that ordinary surgery was not good exophthalmic goitre surgery, the surgeon was learning, in a large measure, how to recognize and avoid fatal errors. At present the confidence of medical men is being gradually restored, and they are again regarding surgery a lesser evil than the disease.

With regard to hyperthyroidism, surgery has been through a long and grilling trial, during the course of which the odds have not always been in its favor; but purely medicinal and hygienic treatment is not satisfactory, and cytolytic serums have not made good. We believe to-day that the rather general verdict is that though surgery alone is not the best treatment of the syndrome, the best cannot be effected without surgery until some better means is found; and that it is the surgeon's duty and to the interest of the patient, the medical profession, and himself, to foster by the surgeon's results the present attitude of growing confidence.

LITERARY NOTES.

Members of medical history clubs, who are constantly stirring up the poor bones of the same men, year in year out, just because about a baker's dozen are supposed to be worthy of this honor, should not fail to read Dr. T. Percy C. Kirkpatrick's "History of the Medical Teaching in Trinity College Dublin and of the School of Physic in Ireland" (Hanna and Neale, Dublin). In this book they will find considerable material for future essays on a subject that has not been quarried by many hands, and a number of anecdotes that could be used to good purpose. But even though the reader may not be so fortunate as to be a member of a medical history club, he will find much in this book that will hold his attention, for the author is not only the possessor of a commendable style, but the student of rare discrimination who knows what to include and what to discard. How many Americans know anything of the medical school in Trinity College, its beginnings some two hundred and fifty years ago, its evolutionary stages, and its position to-day in the medical world? We do not say that we are in deepest ignorance of its existence, but we do say that from what we hear daily from traveling medical men about the German medical schools, the conclusion must be that very few stray to Dublin either in search of knowledge or to satisfy a desire to 'visit' another medical college. Within recent years the city of Dublin has been mentioned more often than any other city, and has come in for the attention it should have received years ago. This has been due to the revival of Gaelic literature and the efforts of such men as Synge, Yeats, Sharp and others, and Lady Gregory to nationalize Irish literature either through the medium of prose and poetry, or through the drama. Now, let us suppose that this fact is not unknown to a number of medical men in this country, and that on account of this awakening they are interested in what Dublin really stands for in the province of education. What more natural than that they should turn to the book under discussion, for there they will enjoy the fruits of another awakening, one that perhaps will interest them more. In the normal evolution of a people literature and medicine go hand in hand; and since this is an unattackable fact, we feel that what the medical school in Trinity College is striving after—reference is here made to the chapters on the School Staff and Modern Development—is part of the revival which is seething all ranks of Irish society to bring their country to the front as a power in the realms of literature, art, and science.

The object of Sir Bertram Windle's "Twelve Catholic Men of Science" (Catholic Truth Society, London) is to show that, despite what the superficial and prejudiced may think of the incongruity of the pursuit of science and the devotion to religion in one and the same person, there

are sufficient notable instances to give the lie to this specious reasoning. That he proves his case must be evident to every reader directly he finishes this very interesting and well-written book; but, even though his plea is well worked out and rests on a basis of ashlar, the prejudice he assails will continue to engross the superficial minds for many a day. Just why science and religion, according to popular opinion, should always be in mortal combat has never been satisfactorily explained either to the man of science or the churchman, and hence must be regarded as one of those figments attributable to a public whose supineness prefers something easy of digestion to ideas that might upset the even tenor of its thought. Now, if the reader, who has battered on this very narrow opinion for so long a time that he is stubborn of interference with his cherished view, will but read the essays in this book, he may not be completely won over, but he must, provided he has the usual quota of intelligence, admit that what he thought could not be other than an interminable war between science and religion is often enough so peaceful a pact as to be convincing of the fact that Linacre, Versalius, Stensen, Laennec, Johannes Mueller, Pasteur and others were hampered in no way by being devout Catholics. Perhaps, if more books of the sort under consideration were written, a better understanding between science and religion would result, and an unnecessary controversy would be abated to such a degree that no longer would we hear the hoary remark that religion is an insuperable obstacle to the full play of scientific thought.

Those readers of Dr. F. G. Crookshank's "Essays and Clinical Studies" who delighted in his unusual point of view, his literary style that disclosed a gift not often found in a medical writer, his erudition which was not dryasdust but was informed with enough of the modern spirit to make it worth while, and, above all, in his conversational and intimate manner of coming to close grips with his readers, will not be disappointed in his latest book, "Flatulence and Shock," from the press of H. K. Lewis, London. The two essays in this slender volume are really so superior to what is generally put out by medical writers, when the itch for writing obsesses them, that comparison is out of the question; not so much on account of Dr. Crookshank's wider knowledge of his subjects, but on account of the fact that here is a man who has thoroughly digested what he has read and what he has observed before putting pen to paper. We take it Dr. Crookshank is widely read outside medicine, and though we are not in a position to say what books are his favorites or which have influenced him most, between the lines of all his writings may be detected that audacious modern spirit which cannot be traced to other sources than to the works of Chesterton, Shaw and Hilaire Belloc. And just because he knows his medicine so well and is in touch with the men in the literary world who are in the advance-guard of

thought, the present essays, as well as those in his former book, have a quality that raises them far above the usual medical paper, which, especially with us, is only too often a poorly constructed effort at writing, carrying with groans an array of technicalities and authorities in the hope that the medical public will be dazzled by the author's industry.

Those amongst us who know Meredith's novels will not have forgotten his rhapsodical version of the romance of Ferdinand Lasalle and Helene von Doenniges, which ended in a duel between Lasalle and Janko von Racowitza in which the former came to an untimely end. Meredith's "The Tragic Comedians," good as it is, for everything that the English novelist touched bore witness to his exceptional talent, concerned itself mainly with the tragic episode in Lasalle's life; and though the man's worth as a political figure was touched upon as well as his genius as a leader of the party he founded in Germany—the Social-Democratic—the side of his life which made him a power, not only for his day, but one might say for ever, at least as regards Germany, is treated in that vague Meredithian way which exasperates even the greatest admirers of the English novelist. An altogether different novel has lately come to our desk from Richard Bong, Berlin, an historical novel entitled "Lasalle: Ein Leben fuer Freiheit und Liebe" by Alfred Schirokauer, in which the author not only writes interestingly of Lasalle's life but brings out, as has never before been done in all the books on this extraordinary man, the literary and political phases of Berlin society when this luminary shot across its horizon. To understand the strivings of a man—his endeavors, his ideals—the setting in which he happens to do his work is of equal importance with his ambitions and undertakings; and that the author is of the same opinion is evidenced on every page of his interesting volume. What the Social-Democratic party is in Germany to-day need not be expatiated on here, for even the American who has merely dipped into Price Collier's articles of recent date must know its power and strength; but what is not so well known is that it was the genius and prescience of Lasalle that gave birth to the idea and foresaw the absolute necessity of such a party in a country that, despite its intellectual progress, is even to-day halted by a conservatism, politically speaking, that has astounded the world. Every physician, we take it, is at heart a social-democrat—his labors, his readings, his studies of human nature must make him so; and since we feel that he may be attuned to the "life-force" of this political leader, we cannot recommend this book too highly. Any book, no matter in what language it is written, that throws greater light on the devious paths of life has a message that should be hearkened to; for from it may come to every sympathetic reader that broadening of his mental powers without which a stodgy existence will continue.

Educators who have been lumbering on in their methods would do well to read with the closest attention W. H. Heck's "Mental Discipline and Educational Values" (John Lane Company, New York). In this book educational psychology, as it is understood to-day, is dwelt upon at length, and the formal discipline which the self-complacent educator is wont to exercise in his relation to his pupils is shown up for the little that it is worth. Of what studies should a curriculum consist has been asked before, but never so pertinently as in this book, nor has the answer been so satisfactory. As everyone knows, who has given the matter any thought, a curriculum is an overburdened matter in all our schools, and especially does this remark apply to our public schools. Now, of all the multitudinous studies with which the modern student is compelled to grapple, which are those which will benefit him most when later on he is brought in relation to the problems which are either going to engulf him or out of which he will arise a better and wiser man? By 'benefit' is not meant a strengthening of character or an increase in physical resistance, but what studies will be of such applicability that he will be eminently fitted to pursue a career with success. As we all know, the student of to-day is grounded in the studies which the science of teaching deems necessary; and though it would be wrong to say that no deep thought has been given the matter by men of the highest worth as educators, it must be admitted that in all curricula as much importance is attached to algebra as to physical geography, to Latin as to English composition, in short, to all studies in equal degree. Now, while this is a good arrangement for the pedagogue, in so far as he knows just what studies he will be called upon to teach, does the student reap those benefits to which he is entitled when he submits his immature mind to the formulating process which all school curricula demand irrespective of predilections or what one study, or at most two studies, should dominate his daily fare so that the natural bent of his mind will be strengthened? These are matters which have engaged the attention of educators before now, and will have to be gone into again and again before decisive changes can be effected. But the more that is written on the subject the easier will be the solution; and while we do not wish to convey to the reader the impression that this book is the only one he should read to see this all-important matter in its true light, we are confident, nevertheless, that a careful reading of it will do much to enlighten him in regard to a subject that too long has been a negligible quantity in our social economy.

ORIGINAL ARTICLES.

FURTHER OBSERVATIONS ON THE TREATMENT OF HUMAN CANCER WITH INTRAVENOUS INJECTIONS OF COLLOIDAL COPPER.*

By LEO LOEB, M. D., H. N. LYON, M. D., C. B. McCLURG, M. D., AND
W. O. SWEET, M. D., of St. Louis.

In a previous paper in the JOURNAL we stated that by frequently repeated injections of colloidal copper, we were able to cause a retrogression in the majority of cases of carcinoma, almost all of which had been inoperable. At the time of our publication, the retrogression had been only a partial one,*although in 2 cases it had advanced so far that the patients appeared to be nearly cured. However, rapidly growing, advanced cases of cancer were not benefited by our treatment. We stated at that time that a definite judgment of the ultimate outcome must still be suspended. Furthermore, we called special attention to the fact that this mode of treatment was still in the experimental stage, and that we, therefore, advised its use to be limited to institutions, in which all means for scientific observations are available. We emphasized the fact that in some cases a gradual diminution in the degree of retrogression had become noticeable, but that retrogression, at the time of our last observations, was still continuous. The present paper contains additional observations on the cases previously mentioned, and, furthermore, data on a number of new cases which were not included in our first report.

CASE I.—History number 1132, white, male, *æt.* forty-eight. (Service of Dr. N. B. Carson; previously reported.) This patient showed marked improvement up to the twenty-eighth injection, at which time the ulcerated mass under the chin, then measuring $3\frac{1}{2}$ by 5 cm., became progressively more and more necrotic. The peripheral induration steadily diminished. The base of the ulcer became drier and more shrunken. In that condition it remained until the forty-third injection. At this time the necrotic mass was scraped away. From this time on retrogression was not noticeable throughout. On the contrary, one point of the tumor appeared to be extending upward along the buccinator muscle to

*We may state here that we had originally intended to publish our first communication at a later date. Conditions over which we had no control made it, to our regret, very difficult for us to refuse an early publication. We might mention that one of the conditions, which prompted us to publish our preliminary report, was the fact that, notwithstanding our efforts to carry out our work quietly, thereby avoiding undue publicity, information concerning our experiments had been spread prematurely among the public, and exaggerated reports of their character and of the results obtained had been circulated.

We wish again to advise, most emphatically, that this mode of treatment be regarded as still entirely in the experimental stage and at present unsuited for use in general practice.

ward the ear. A quiescent stage seems to have been reached in the mass under the chin. The patient's general condition at the present time is good.

CASE II.—History number 1405, white, male, *et.* seventy-four. (Service of Dr. N. B. Carson; previously reported.) This patient has received fifty-nine injections. At the present time there is very little evidence of the tumor either to the touch or to the eye. A small area of leucoplakia still remains on the buccal mucous membrane. This area, however, is thinner and more freely movable than before. Several white spots about the size of a pinhead still remain on the hard palate adjacent to the involved portion of the buccal mucous membrane. The patient's general health has remained good.

CASE III.—History number 1439, white, male, *et.* thirty-nine. (Service of Dr. N. B. Carson; previously reported.) Since the last report this patient's condition has varied greatly as regards the tumor. The glands that were merged in diffuse masses became more defined and softened, but never broke down completely. The protruding mass in the scar on the neck exacerbated, but during recent injections showed a tendency again to recede. Circulatory disturbances have been most marked in this case, and much of the temporary exacerbation is, as repeated microscopical examinations proved, due to such disturbances, and not to renewed growth in the tumors. All in all, retrogression has taken place, but in a less remarkable degree than in other cases. The patient's general health continued good up to his leaving the hospital for the holidays.

CASE IV.—History number 1436, white, female, *et.* sixty-nine. (Service of Dr. N. B. Carson; previously reported.) From the twentieth injection to the thirty-fifth the lesion steadily improved. From the thirty-fifth injection to the present time an unhealed area about 2 cm. by 1½ cm. has remained about the same. The pearly edges have disappeared, and the discharge is much less and does not form the tenacious blackish crust as previously. The glands in the neck are no longer palpable. The failure of this area to heal was due to a purulent discharge from the ear, constantly irritating the ulcer. Since covering this area with vaseline, healing has set in.

CASE V.—History number 3614, white, male, *et.* thirty-nine. (Service of Dr. M. F. Engman; previously reported.) A case of multiple carcinoma. The cancerous process on the nose has continued to improve; the indurated pearly border has disappeared. Many of the crusts have fallen off, leaving a healthy looking tissue beneath, with no evidence of keratinization as yet. The lesion upon the lip has healed in one-half of its area. The unhealed portion shows no improvement. Many of the keratotic plaques have fallen off, leaving the skin clear and healthy looking. Many of the small nodules in the skin have disappeared. The ulcer at the inner canthus is healthier looking, with less purulent discharge.

CASE VI.—History number 1430, white, male, *et.* fifty-six. (Service of Dr. N. B. Carson; previously reported.) Up to the twenty-fourth injection the tumor mass continued to retrogress, retrogression becoming slower toward the last. At the time of the patient leaving the hospital, the tumor mass no longer discharged as freely, and in its total area had contracted and flattened down to the level of the skin. Patient's general condition had improved. During the time the patient was under treatment, a staphylococcal infection, which the patient had had before entering the hospital, continued to become more extensive, involving the subjacent tissue, periosteum and bone over the molar process and extending up under the scalp. This to some extent interfered with observations of the tumor. After the twenty-fourth injection, the patient, who appeared to be mentally abnormal at the time he entered, left the hospital.

CASE VII.—History number 1412, white, female, *et.* fifty-eight. (Service of Dr. N. B. Carson.) This patient entered the hospital with the right cheek entirely

destroyed by carcinomatous ulceration, exposing the buccal cavity from the insertion of the canines to the base of the tongue, extending backward to the insertion of the ear, measuring $8\frac{1}{2}$ by 6 cm., surrounded by an indurated and pearly edge. The patient's general condition was not good. Up to date she has had twenty-seven injections. During this period her appetite has improved, and she has been relieved of pain. The indurated margin shows no change, but over the surface of the induration numerous granular elevations have appeared. Microscopically, this tissue shows decided retrogressive cellular changes. The discharge has been lessened in quantity and the odor has very much diminished. The infiltration of the border was so great that the eye could not be closed. This has improved so that the patient can now close the eye. There seems to be a beginning of a partial filling up of the cavity by granulation tissue.

CASE VIII.—History number 1298, white, male, *æt.* thirty-seven. (Service of Dr. N. B. Carson.) Original carcinoma of the tongue operated on by Dr. Frank J. Lutz, April, 1912. Recurrence in the submental and submaxillary lymph-glands about a month and a half ago. On the right side of the neck were seen two glandular enlargements about the size of a hickory nut, below which was a small ulcerated area protruding about 6 mm. above the level of the skin. The gland underneath the chin enlarged. This patient has had only seven injections. At the present time there is a very appreciable change in the size and consistency of the glands; they have become smaller and softer, and a thin, serous discharge, containing cheesy masses, is now coming away through the ulcerated area. The ulcerated area has sunken to the level of the surrounding skin and has a healthy appearance. General health remains good.

CASE IX.—History number 1455, white, male, *æt.* forty-six. (Service of Dr. N. B. Carson.) This case was originally an epithelioma of the lip. The patient resorted to various paste cures at the hands of quacks, with resulting increase in the size of the ulcer. When he appeared at the hospital there was present an ulcer about 4 cm. in diameter, beginning at the mucocutaneous border of the lip and extending downwards more than half way to the point of the chin. This ulcerated area was raised 6 mm. above the level of the skin, was of leather-like consistency, and had inverted margins that were firm and pearly. The glands in the neck and under the chin were not enlarged. This patient has had seventeen injections. During the period of treatment the protruding ulcerated mass was seen to shrivel and shrink considerably in size. The surface was freed of its necrotic discharge, and the leather-like consistency was so changed that the patient now moves the lip with ease, while before it was rigidly fixed. A small, hard gland became palpable just under the chin in consequence of the resolution of the indurated material round the gland.

CASE X.—History number 1454, white, male, *æt.* sixty-five. (Service of Dr. N. B. Carson.) This patient was operated upon about one year ago for a cancerous tumor on the right cheek; recurrence took place about four months later, when a second operation was performed. Upon entrance to the hospital, November 25th, 1912, the patient presented a large perforating ulcer of the cheek, extending from the angle of the mouth to the ear, with indurated margin and progressively ulcerating. The patient suffered considerable neuralgic pain, necessitating opiates. He has had twenty-three injections, and now expresses himself as completely relieved of pain. The ulcerated area discharges less and is studded with granulations which microscopically prove to be degenerate tumor tissue. The indurated margin has not healed. The area of ulceration has, so far, not contracted. The patient's general health is good, and though advanced in years he expresses himself as in good condition.

CASE XI.—History number 1458, white, male, *æt.* forty-two. (Service of Dr. N. B. Carson.) Disease began about two years ago with a hardening on the

inner side of foreskin, which gradually increased in size, and about a year ago ulcerated. The inguinal glands on both sides became involved, and extensive sloughing took place. Upon entrance into the hospital, December 4th, 1912, more than two-thirds of the penis had been lost through ulceration; instead, we find a large cauliflower-like excrescence. The inguinal regions on both sides show extensive sloughing with deep ulceration. A large quantity of fetid pus was discharged from this area. The veins of both thighs showed much inflammation. He has had seventeen injections with no marked change in his general condition, but a noticeable change in the quantity and odor of the discharge. The ulcerated area has a cleaner look, and there are also numerous granulations springing up from the bottom of the ulceration.

CASE XII.—History number 1453, white, male, *æt.* fifty-three. (Service of Dr. N. B. Carson.) This patient had an epithelioma of the right side of the lip, about one year ago. June, 1912, this was removed by operation, and in the following August the glands under the chin were removed. One month afterward he noticed soreness and swelling over the point of the chin, extending downward beneath the chin; this area softened and ulcerated at a point just under the chin. Upon entrance into the hospital, November 20th, 1912, a large, hard mass was found to occupy the entire chin, extending upwards midway to the lip; there was also present a considerable elevation above the surrounding skin, and beneath the chin the tumor reached almost to the hyoid bone. In the centre of this mass under the chin was a large ulcerated area, discharging freely. The outlines of the inferior maxilla were lost. This patient has had thirty injections. At the present time the mass has receded so that the chin contour is now well defined and the man presents an almost normal profile. The tumor mass under the chin is considerably smaller, but has receded more slowly than the mass upon the chin. The ulcerated area has contracted in size, and no longer gives off much discharge. His general health has remained good throughout.

CASE XIII.—History number 1441, white, male, *æt.* seventy-two. (Service of Dr. N. B. Carson.) Entered hospital November 1st, 1912, with many patches of keratosis senilis scattered over the face and back of the hands. On the back of the left hand there was a typical epitheliomatous change. On the left side of the face just above the maxilla, there was an ulcerated area somewhat larger than a dollar, contiguous to a hard nodule just below and firmly fixed to the jaw. This patient has had twenty-four injections. At the present time several of the keratotic patches have dropped off; the patch upon the back of the left hand is very much smaller, with healthy looking new skin extending over the affected area. The ulcerated area on the side of the face also has a much healthier base, and its margin is now showing new skin. The hard nodule has shown no appreciable change, except that it is possibly softer and has discharged a thin serous fluid. The patient's general health has remained good throughout.

CASE XIV.—History number 1404, white, male, *æt.* forty-four. (Service of Dr. N. B. Carson.) This patient entered the hospital September 3rd, 1912. In 1910, a small ulcerated area appeared upon the lower lip. He had been treated with many salves and pastes, so that when he entered the hospital he had a very large ulcerated area that had destroyed the entire lower lip and extended to the mandible, with a loss of all the front teeth to the angles of the mouth and upward on the right upper lip. The tumor extended downwards over the chin, involving the glands beneath and behind it. The border of the ulcerated area was cartilaginous and pearly in appearance. The case was treated surgically by removal of the glands beneath the chin and of a part of the lip. Later, mesothorium was applied without result. Up to the present time he has had

thirty-one injections. Steady recession of the tumor mass has taken place, the ulcerated area has diminished by one-half, and new skin is steadily creeping inward and outward over this area. The patient's pain has been completely removed, and his general condition has improved.

CASE XV.—History number 1442, white, male, *æt.* forty-one. (Service of Dr. N. B. Carson.) This patient's disease began about a year and a half ago. Following a blow upon the jaw a swelling developed on the cheek external to the teeth. This ulcerated, and the gums began to swell; an extension occurred to the outer surface of the cheek and to the submaxillary gland so that externally two hard tumor masses could be palpated. Just below, and apparently continuous with the tumor within the mouth, was an ulcerated excrescence about the size of a dollar. The mass within the mouth extended from the canine tooth to the angle of the jaw and was cauliflower-like in appearance. This was his condition upon being admitted to the hospital, November 1st, 1912. This patient has had thirty injections. There has been a steady recession of the infiltrated area externally, and the excrescence already described is one-third its former size and dry, so that it appears as a scab. The tumor in the mouth has also diminished in size, though not so markedly as the external one. It is, at present, below the level of the teeth, and the patient can open and close his mouth more completely than he was able to do before, because the tumor mass had extended 6 mm. above the level of the teeth. The glandular enlargement has diminished in size, and has become much softer. His general health has remained good throughout.

CASE XVI.—History number 371, female, white, *æt.* thirty-six. (Service of Dr. Fred J. Taussig.) Was admitted to the hospital December 4th, and examination by Dr. Taussig disclosed a large omental mass circumscribing the umbilicus, a large retro-uterine mass, and masses in the inguinal region. This patient's general health was very good, she being able to be actively engaged. She has had fifteen injections, and Dr. Taussig reports, December 21st, that the masses are softer in consistency, and that the largest abdominal circumference has been reduced 8/10 cm. Her general health has remained good and she is as active as before.

CASE XVII.—History number 369, female, black, *æt.* thirty. (Service of Dr. Fred J. Taussig.) This patient was operated upon three years ago; apparently a total hysterectomy for uterine cancer had been done. She recovered readily and remained well for one year, when she began to complain of severe pelvic pain and continued loss of weight. Examination on admission disclosed a mass in the right iliac region, about the size of an orange, and another mass in the mid-pelvic region, irregular in outline, about one-half the size of an orange. This patient has had eighteen injections. Dr. Taussig reports after examination, December 26th, the following: "Patient is much improved, has practically no spontaneous pain. Very slight sensitiveness on deep pressure over mass on right side. No marked difference in consistency. The mass on the right pelvic wall is now much smaller and flattened out against the wall."

CASE XVIII.—History number 1223, female, white, *æt.* thirty-six, unmarried. (Service of Dr. N. B. Carson.) This patient was operated on a year and a half ago for malignant tumor of the left breast. Radical operation with the removal of axillary glands was done. Three months later, recurrence in the skin-flaps at the site of operation was observed; operation. About three months after, cervical glands of left side were found enlarged and removed. Two other recurrences shortly after this took place in the skin over the left chest; radical removal and skin-grafting. The patient returned December 11th, 1912, with a large tumor in the right breast, an enlarged gland in the right cervical region, and enlarged axillary glands on the right side, as

well as several tumor masses at the site of former operation upon the left side. This patient has had thirteen injections. There is a distinct improvement in the tumor nodules over the right breast; no change as yet can be observed in the other tumors. This patient's general health has been excellent throughout, with no evidence of metastases elsewhere in the body.

CASE XIX.—History number 1461, female, white, *æt.* thirty-seven. (Service of Dr. N. B. Carson.) In June, 1910, the left breast was amputated for malignant tumor. November, 1911, the left cervical chain of glands was removed. September, 1912, other glandular enlargements on both right and left sides of neck were observed, as well as a small nodule in the skin of the epigastrium just below the ensiform appendix. During the past three months patient has suffered with progressively increasing dyspnea, and attacks of tachycardia and cyanosis, with increased dyspnea at time of attacks. Upon entrance into the hospital the patient was found greatly reduced in strength; slight loss of weight, pulse ranging from 110 to 120, and marked dyspnea which greatly increased upon exertion. No rise of temperature was observed at any time. Enlarged glands were present upon the left side of neck above and along course of previous operation. Several enlargements upon right side of neck and a small nodule in the epigastrium. The physical examination made it probable that there was involvement of the mediastinum and right lung, with pleural effusion and possibly heart metastases. The case was from the beginning a hopeless one; but at the urgent wish of the patient and her husband injections were begun. She received in all ten injections. During this time her strength improved, appetite returned, and a severe pain that had radiated in the left shoulder and occipital region disappeared. The glands on both sides of the neck became smaller and softer, as was noted by the patient herself and her husband. The cardiac condition and the dyspnea were naturally not affected. The patient died two weeks after admission, with symptoms of heart failure. The post-mortem showed the pericardial sacs to be filled with a serosanguinolent fluid. The pleural cavities also contained a fluid of the same character; a greater quantity on the left side. The right lung was collapsed and had the size of an adult male fist and the consistency of spleen or muscle, and was void of any patent air-vesicles. This condition was found to be due to an obstruction to the entrance of air resulting from the complete occlusion of the bronchi at the hilus, which was caused by pressure exerted through metastatic tumors in the peribronchial lymph-glands and through tumor masses in the mediastinum. There were no metastases in the remaining lung tissue of either side, but a small tumor mass was found near the auriculoventricular border of the left auricle.

SUMMARY.

The histories which we report in this communication confirm essentially our former conclusions. Rapidly growing tumors, which lead to extensive metastases in the internal organs, and those in which cachexia is pronounced, cannot be benefited by our treatment. In the large majority of all other cases which must be considered inoperable, the continued intravenous injections of colloidal copper lead to a gradual retrogression of the tumor; and, in the majority of cases, there is noticeable a marked diminution in the pain from which the patient suffers. Furthermore, our more recent observations confirm the statement made in our first publication—namely, that in a number of cases there is a gradual decrease in the effect of the injections.

This slowing in the progress of retrogression of the tumors became more pronounced the further our work progressed; and, in the majority of our older cases, it is doubtful whether any progress has been made within the last few weeks. In one case which had retrogressed quite markedly, there was perhaps a further extension of the growth within the last two weeks. It is not improbable that in this case the repeated cuts made into the tumor, for the purpose of removal of necrotic material, may have stimulated the growth-energy of the cancer. This gradual diminution in the efficiency of the intravenous injections has, however, as yet, not become apparent in every case. On the contrary, there were a number of cases in which the healing processes became perhaps more marked after the twentieth injection had been given.

We regard, as a most important result of our investigations, the conclusion that we now have the means at hand to cause a gradual, although only partial, retrogression of the large majority of inoperable cancers, provided they have not yet progressed to the last stage of the disease. On the other hand, we believe that the action of the intravenous injections of colloidal copper is too slow to render it probable that in the large majority of cases a cure will be accomplished by this mode of treatment. At present it is, however, still too early to make any definite statement as to the ultimate fate of the patients who are under our treatment.

Our further investigations add some interesting information on the action of colloidal copper in carcinomata in which there is extensive ulceration. In two of these cases we observed, as the first effect of the injections, a gradual springing up of granulations from the bottom of the ulcers. Microscopically, we found these granulations to consist of a superficial layer of tumor tissue at the base of which we found proliferating connective-tissue. It is very probable that under the influence of the colloidal copper, the proliferative energy of the connective-tissue is relatively increased, and that this change leads, secondarily, to the elevation of the tumor tissue in the form of granulations. We, furthermore, may conclude that the degree of response to the treatment varies somewhat in different cases; while some cases show a very strong reaction, in others it is less marked. Our latest observations again confirm our previous conclusion—namely, that the majority of human carcinomata are more amenable to the influence of colloidal copper than is mouse cancer. This will readily be seen if we compare, on the one hand, the doses of the substance necessary in the case of mice afflicted with cancer and in the case of patients. It would be impossible to give to human beings amounts of colloidal copper which correspond to the comparative weight of mice and human beings. Besides, a comparison between this paper and the following, dealing with the effect of copper on cancer in mice, will show that we have not been able to cause a marked retrogression of mouse cancer by the injections of colloidal copper. A

temporary inhibition of growth represents the maximum effect on mouse cancer, while in patients the colloidal copper leads, in a large majority of cases, to a partial retrogression of the cancer. The appreciation of this fact is of great significance in guiding us in our future work; and it gives us hope that when more efficient means will have been found, which will lead to a more rapid retrogression of cancer than has been accomplished so far through colloidal solutions of copper, we may not only be able to cause a partial retrogression, but a cure. On the other hand, our own experience, not only with colloidal copper, but also with certain other substances, shows that the general reaction of human beings to some of those substances which cause a retrogression of animal tumors is much more marked than the reaction in mice. The lethal dose is, therefore, probably very much lower in the case of man; and this fact makes us reluctant at present to predict the outcome of the investigations which we are continuing in various directions.

THE INFLUENCE OF INTRAVENOUS INJECTIONS OF VARIOUS COLLOIDAL COPPER PREPARATIONS UPON TUMORS IN MICE.*

(A PRELIMINARY REPORT.)

By LEO LOEB, M. D., MOYER S. FLEISHER, M. D., W. E. LEIGHTON, M. D.,
AND O. ISHII, M. D., of St. Louis.

We wish to report here our experiments concerning the influence of various colloidal preparations of copper upon the tumors of mice. In our experiments we used mice inoculated with an adenocarcinoma which was first used in our laboratory and which grows in 83 per cent. of the inoculated mice. This tumor is a very rapidly growing one until the fourth week after transplantation; after this time the increase in size is very much less marked. Ten to twelve days after transplantation the tumor has grown to the size of a hazelnut; at three weeks it may measure 25 by 15 mm.

We used five different preparations of copper: pure solution of colloidal copper prepared according to Bredig's method, and four preparations made by combining copper and casein. These preparations which were made by Dr. E. H. Keiser, we shall designate as copper casein A, B, C, and D.**

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**In a later publication the details of the preparation of these copper-casein compounds will be fully described.

The largest number of experiments have been carried out with a pure solution of colloidal copper. We were not able to kill mice by injection of 2 c.cm. of this solution. It was quite evident that the injection of colloidal copper into tumor mice had some influence on the tumor. In practically all cases in which a strong solution of copper was injected, the tumor either did not grow during the time the injections were continued, or its growth was very much retarded. However, only in 2 cases did an actual retrogression take place, and in these 2 cases the tumors broke down, ulcerated, and ultimately disappeared.* Mice were injected with this solution usually six or seven times on successive days, but in some cases as often as twelve times, in others only four or five times. It was evident that the influence on the tumor could only be produced if the injections were given every day, since in those cases, in which we allowed one or two days to elapse between the injections, the tumor grew as rapidly or almost as rapidly in the injected animals as it did in controls. In those cases in which the solution of colloidal copper used was too weak for a short period during our experiments, the growth of the tumor was not retarded. The intraperitoneal or subcutaneous injection of colloidal copper had no effect whatsoever upon the growth of the tumors.

When the injections were given every day, the growth of the tumor was checked or inhibited during the first five to seven days. If, however, the injections were continued over a longer period, it appeared that the growth of the tumor could no longer be entirely checked. It is, however, possible that in these later periods not as much of the substance could be injected because of the interference with the permeability of the vein after a large number of injections had been given. When, on the other hand, the injections were stopped, the tumor began to grow very rapidly, indeed as rapidly as an untreated tumor of the same size.

A large number of experiments were also carried out with copper casein A. The maximum dose of this preparation was 1 mg.; and this quantity was injected, dissolved in 0.50 c.cm. of 0.85 per cent. sodium chloride solution. When a trifle more than 1 mg. of this preparation was injected into the mice, the animals died within a few minutes, although the injection of only 1 mg. produced no apparent symptoms of intoxication.

The action of copper casein A. was similar to that of the colloidal copper, but it was much more variable in its effect. The growth of the tumors was not checked in all cases; but, as we used the same prepara-

*In those cases which we have considered as cures the tumors at first showed a dark, apparently hemorrhagic area lying close under the skin, which gradually increased in size until it involved about half of the tumor. The fluid material in this was discharged through the ulceration of the overlying skin and the rest of the tumor then gradually disappeared. A disappearance of tumors, such as we found after administering the various copper preparations, was never observed in cases in which tumors retrogressed spontaneously, or in which a tumor retrogressed after spontaneous ulceration had set in.

tion throughout all our experiments, this variation cannot have been due to differences in the preparation. However, in the majority of cases, the growth of the tumor was checked during the time of the administration; and, as with colloidal copper, in only two instances did the tumor break down and disappear. It appears, however, that copper casein A. will not inhibit the growth of the tumor for as long a period as will the colloidal copper; and it is probable that the growth is not as completely checked. Even during the time of injection of copper casein A., the tumor often grows, although very slightly.

Copper casein B. was quite toxic; the lethal dose for a mouse was 0.25 mg. The lethal dose of copper casein C. was a little more than 1 mg. Both these preparations were tested on mice in which tumors were growing, but in no case was the growth of the tumor checked.

Copper casein D. was very much less toxic than any of the other preparations; 12 to 15 mg. would kill a mouse, while 10 mg. could be injected into mice without any apparent ill effect. In our experiments we used doses varying between 8 and 10 mg. It was evident that the injection of this preparation absolutely inhibited the growth of the tumor during the time of injection; but, when the injections were stopped, the tumor grew again at the usual rate. This preparation has never been injected into mice over a period longer than one week, and during that time practically none of the tumors has grown, or if a few have grown, they have increased very slightly in size. While colloidal copper and copper casein A. caused the retrogression of the tumor in a few exceptional cases, such an action was not observed in the case of copper casein D. However, its action in inhibiting the growth of the tumor has been more uniform than that of either of the two aforementioned preparations.

SUMMARY.

We, therefore, find that three of the five copper preparations which we have used have shown an influence upon mouse tumors—namely, colloidal copper, copper casein A. and copper casein D., while the two remaining preparations showed no influence. In the main, the character of the influence of the three preparations upon the tumors is the same, although there are some slight quantitative differences in their efficiency. The influence of copper casein D. seems to be most marked; that of colloidal copper only slightly more marked than that of copper casein A., which latter is the weaker.

The injection of these substances inhibits the growth of the tumors during the time the injections are being made, or at least during the early portion of this time, the degree of inhibition varying slightly with the different preparations and also slightly in different mice. If the injections are stopped, the tumors at once take on their usual very rapid rate of growth. In considering the results of these experiments, it must be borne in mind that we dealt entirely with a very rapidly growing tumor.

SOME REMARKS ON THE DIAGNOSTIC VALUE OF HEMATOLOGICAL EXAMINATIONS.

By JOHN M. SWAN, M. D., of Rochester, N. Y.

One hundred years ago it was the custom of the physician to diagnose such diseases as diabetes and nephritis from the symptoms presented by the patient. In 1839 Bright's paper on the association of dropsy with albuminuria was published, and to-day no physician can claim that he has used 'average care' in the diagnosis of a case of disease unless he has made both chemical and microscopical examinations of the patient's urine. It would undoubtedly rouse a storm of protest if the writer should say that no case could be considered thoroughly studied unless a blood examination were made. And yet, such an examination will often throw important light on a case of chronic disease and sometimes on an acute disease of obscure etiology. The writer will unhesitatingly say that every patient who looks anemic should have a blood examination made. And so should every patient who presents an enlargement of the spleen, or an enlargement of the lymph-nodes, or who has had a hemorrhage. Many times the result will be that of an ordinary chloranemia; but in some cases a result will be obtained that will give such important information that one will be amply repaid for all the time used in the negative examinations.

Several years ago, when the writer was connected with the Presbyterian Hospital in Philadelphia, the resident physician on duty in the woman's surgical ward had under his care a patient with a fractured leg. In making a routine physical examination of the patient, he discovered that she had palpable superficial lymph-nodes, and on making a blood-count found a hyperleucocytosis, the exact figures of which are not on record, but the differential count gave the following result: Polymorphonuclear neutrophils, 2.4 per cent.; lymphocytes, 93.6 per cent.; large mononuclears, 2.6 per cent.; myelocytes, 1.4 per cent.; total, 100.0 per cent. In counting 500 leucocytes, 79 degenerate forms were seen. Such a result was, of course, a matter of great satisfaction, and gave the surgeon a more accurate idea of the patient's condition than he would otherwise have had.

It is the writer's intention to give some examples of the results of blood examinations made during the last six months, to point out the bearing of these examinations on the diagnosis of the cases, and to make a few remarks about the problems of diagnosis involved.

CASE I.—Male, *æt.* fifty-five, seen in consultation with Dr. J. W. McCauley. The man had been feeling out of sorts for about two weeks, and three days

before the writer saw him had a temperature of 104° F. His chief symptoms, in addition to the fever, were muscular and abdominal pain and headache. The features of importance brought out by the physical examination were the existence of a soft systolic murmur at the apex of the heart, a high blood-pressure and albuminuria with casts. The spleen was not palpable; there was no exanthem. A provisional diagnosis of typhoid fever was made. We decided to make a blood-count and to send a specimen of blood to the Bureau of Health for an agglutination test with *B. typhosus*. The result of the blood examination was as follows: 9:00 p. m.: Erythrocytes, 5,900,000; leucocytes, 7,440; ratio, 1-793; hemoglobin, 80 per cent. (Sahli); color index, 0.67. Differential count: Polymorphonuclear neutrophils, 61.4 per cent.; lymphocytes, 33.6 per cent.; large mononuclears, 2.6 per cent.; transitionals, 0.4 per cent.; eosinophiles, 1.2 per cent.; basophiles, 0.8 per cent.; total, 100.0 per cent. Suspicious malaria parasites.

The blood was obtained at 9 p. m., when the patient's temperature was 101° F. The cell count and the differential count were suggestive of typhoid fever. But in making the differential count several bodies which resembled partially degenerated malaria parasites were seen. If the large mononuclears had been increased instead of the lymphocytes, it would have been possible to make a positive diagnosis of malaria from this one blood examination. On account of the increase of the lymphocytes it was thought wise to make a further examination of the blood in order to be positive about the existence of parasites. Therefore, two other examinations were made; one at 5:00 p. m. on the following day, when the patient's temperature was 104° F.; and the other on the second day when the patient's temperature was 103.4° F. (1) 5:00 p. m.: Differential count: Polymorphonuclear neutrophils, 58.0 per cent.; lymphocytes, 34.4 per cent.; large mononuclears, 6.0 per cent.; eosinophiles, 1.6 per cent.; total, 100.0 per cent. Four malaria parasites were seen in counting 500 leucocytes. The slide was poorly stained. Temperature, 104.4° F. (2) 3:00 p. m.: Differential count: Polymorphonuclear neutrophils, 82.6 per cent.; lymphocytes, 12.4 per cent.; large mononuclears, 4.8 per cent.; eosinophiles, 0.2 per cent.; total, 100.0 per cent. Eighteen benign tertian parasites were seen in counting 500 leucocytes. Small rings, gametocytes and one imperfect rosette. Smear made during paroxysm. Temperature, 103.4° F.

Malaria parasites were found at both these examinations. This was a very mild case of benign tertian malaria. The blood presented an unusual condition—instead of an increase of the large mononuclear leucocytes, which is characteristic of malaria, the differential counts of the three specimens of blood showed an increase of the lymphocytes.

CASE II.—Male, *æt.* twenty, referred by Dr. C. O. Sayres. The young man presented a chronic enlargement of the cervical lymph-nodes on the right side of his neck. This enlargement had been originally noticed on April 1st, had extended rapidly, and both the anterior and the posterior groups of lymph-nodes were involved. A week or two after the enlargement was first noticed, a surgeon in Buffalo removed the enlarged glands. After the operation the enlargement continued, and, at the time the patient came under the writer's observation, was quite extensive. The enlarged glands were confluent, but were not adherent to the overlying skin. The supraclavicular glands were also palpable. The spleen was not enlarged. Dr. Sayres brought the patient to the writer for the purpose of a blood examination, which gave the following result: Erythrocytes, 5,460,000; leucocytes, 9,040; ratio, 1-602; hemoglobin, 88 per cent. (Sahli); color index, 0.80. Differential count: Polymorphonuclear neutrophils, 68.0 per cent.; lymphocytes, 23.8 per cent.; large mononuclears, 2.2 per cent.; transitionals, 3.0 per cent.; eosinophiles, 1.4 per cent.; basophiles, 0.4 per cent.; myelocytes, 1.2 per cent.; total, 100.0 per cent.

This examination resulted in the demonstration of a chloranemia, with a normal number of leucocytes. The differential count showed a normal leucocyte formula, which positively excluded leukemia. This exclusion might perhaps have been definitely accomplished by the clinical examination; the enlargement of the lymph-nodes not being of the kind usually seen in leukemia. It definitely excluded the diagnosis of lymphosarcoma, because in that case there would have been an increase in the lymphocytes. The diagnosis then lay between Hodgkin's disease and tuberculosis of the cervical lymph-nodes. If there had been an eosinophilia, the writer would have suspected the former. Hodgkin's disease, however, is not always attended by eosinophilia. Dr. Sayres then made a Moro test which was positive.

The anemias are of two types; first the type of chloranemia which is characterized by a moderate reduction in the number of erythrocytes, a greater reduction in the percentage of hemoglobin, and a consequent low color index. In this type of anemia the leucocytes are normal in number or there may be a slight leucocytosis. The differential count usually shows no change from the normal, except, perhaps, an increase in the polymorphonuclears in some cases. Such an anemia is known as a chloranemia because it corresponds to the condition of the blood found in the disease known as chlorosis. In recent years there has been a tendency among hematologists to discard chlorosis as a disease *sui generis*. As one author has said: "Show me a case of chlorosis and I will show you a case of incipient tuberculosis, nephritis or some other organic disease." And Stengel has said that for several years he has looked in vain for a case of chlorosis. In other words, if a patient presents a blood picture with the characteristics of a chloranemia, the anemia is in all probability secondary and not primary. Such blood pictures are seen after hemorrhages, in cases of chronic septicemia, in cases of tuberculosis, nephritis, heart disease, carcinoma, etc. An anemia following a hemorrhage differs from an anemia following the other conditions just mentioned, in that the color index in the post-hemorrhagic anemia is usually nearer 1.0 than it is in the anemia accompanying the other conditions.

CASE III.—Female, *wt.* forty-nine, seen in consultation with Dr. J. S. Berkman. She had had a large hemorrhage from a gastric ulcer. The following results were obtained: Erythrocytes, 2,050,000 (average of four counts); leucocytes, 12,320; ratio, 1-166; hemoglobin, 27 per cent. (Sahli); color index, 0.65. Differential count: Polymorphonuclear neutrophiles, 87.6 per cent.; lymphocytes, 7.2 per cent.; large mononuclears, 1.0 per cent.; transitionals, 3.6 per cent.; eosinophiles, 0.6 per cent.; total, 100.0 per cent. In counting 500 leucocytes, 3 normoblasts were seen. Anisocytosis, polychromatophilia, poikilocytosis. Second count: Erythrocytes, 1,822,500 (average of four counts); leucocytes, 10,240; ratio, 1-177; hemoglobin, 25.5 per cent (Sahli); color index, 6.69+. Differential count: Polymorphonuclear neutrophiles, 86.6 per cent.; lymphocytes, 10.0; large mononuclears, 0.8 per cent.; transitionals, 1.8 per cent.; eosinophiles, 0.2 per cent.; basophiles, 0.6 per cent.; total, 100.0 per cent. In counting 500 leucocytes, 4 normoblasts were seen. Anisocytosis, polychromatophilia, moderate poikilocytosis. Third count: Erythrocytes, 1,680,000 (average of four counts); leucocytes, 9,120; ratio, 1-184; hemoglobin, 24.5 per cent.

TABLE I.

Date	Hemoglobin Per cent.	Erythrocytes	Color Index	Leucocytes	Polymorphonuclear Granular Cells				Uninuclear Non- Granular Cells			Remarks
					Absolute Number	Neutrophils Per cent.	Eosinophiles Per cent.	Basophiles Per cent.	Absolute Number	Lymphocytes Per cent.	Large Mononu- clears and Transitionals Per cent.	
1912												
June 16th.....	60	2,110,000	1.42	12,560	9,294	72.2	1.6	0.2	3,114	24.4	0.4	1.2
July 2nd.....	61	2,090,000	1.45	7,040	3,998	52.4	4.2	0.2	3,042	41.6	1.6	
July 27th.....	60	2,670,000	1.12	10,720	7,482	67.0	2.8	—	3,237	28.0	2.2	
August 21st.....	73	3,080,000	1.01	13,640	7,747	56.2	0.6	—	5,892	40.2	3.0	
September 21st.....	76	3,490,000	1.08	10,320	6,522	60.8	2.0	0.4	3,550	31.2	3.2	2.4

TABLE II.

1912												
April 6th, 3 p. m.....	94	6,320,000	0.74	9,840	5,175	50.4	1.0	1.2	4,664	44.0	3.4	
July 14th, 1:30 p. m.....	92	5,030,000	0.91	7,680	3,456	43.0	1.2	0.8	4,224	53.8	1.2	
August 4th, noon.....	92	5,490,000	0.83	6,320	3,273	49.6	1.8	0.4	3,046	43.6	4.6	
October 6th, 11 a. m.....	98	5,440,000	0.90	7,200	3,873	51.2	1.6	1.0	3,283	44.2	1.4	0.6

TABLE III.

1912												
April 26th.	90	6,380,000	0.70	9,520	4,293	58.4	3.6	0.4	2,573	33.8	3.6	0.2
June 14th.	82	5,080,000	0.80	6,880	3,935	55.0	1.6	0.6	2,889	22.6	19.4	0.8
July 24th.	86	4,890,000	0.87	6,080	3,720	56.2	4.6	0.4	2,359	34.0	4.8	

TABLE IV.

1912												
July 3rd.	87	5,860,000	0.74	4,400	2,692	59.0	0.6	—	1,707	36.4	4.0	
August 5th.	82	5,680,000	0.72	5,360	3,162	58.0	1.0	—	2,197	36.6	4.4	
September 10th.	93	5,510,000	0.84	7,680	3,686	46.8	1.0	0.2	3,993	49.4	2.6	

(Sahli); color index, 0.72. Differential count: Polymorphonuclear neutrophiles, 88.8 per cent.; lymphocytes, 7.8 per cent.; large mononuclears, 0.8 per cent.; transitionals, 1.8 per cent.; basophiles, 0.8 per cent.; total, 100.0 per cent. In counting 500 leucocytes, one normoblast was seen. Anisocytosis, poikilocytosis, polychromatophilia.

The blood counts were made every other day for a week; they showed a marked oligocythemia and a marked oligochromemia. The color index was lower than is customary in uncomplicated cases of post-hemorrhagic anemia. The differential count showed an increase in the polymorphonuclear neutrophiles. The presence of nucleated red cells is to be expected. In this case it would probably have been better if the number of nucleated red cells had been greater. We look upon the occurrence of normoblasts in these cases as an attempt on the part of the bone marrow to replace the lost erythrocytes.

The blood counts in the following two cases are illustrations of the blood picture of cases of carcinoma.

CASE IV.—Male, *æt.* sixty-seven. The blood count was made about a week before the patient died of carcinoma of the liver. The blood shows a chloranemia with a moderate leucocytosis and a marked increase in the polymorphonuclear neutrophiles. The presence of myelocytes in this blood is accounted for by the severity of the anemia. Erythrocytes, 4,040,000; leucocytes, 19,920; ratio, 1-202+; hemoglobin, 61 per cent. (Sahli); color index, 0.75+. Differential count: Polymorphonuclear neutrophiles, 90.2 per cent.; lymphocytes, 4.8 per cent.; large mononuclears, 0.4 per cent.; transitionals, 1.0 per cent.; eosinophiles, 2.4 per cent.; myelocytes, 1.2 per cent.; total 100.0 per cent.

CASE V.—Male, *æt.* fifty-seven, carcinoma of the rectum, adherent to the sacrum, seen in consultation with Dr. Alva P. Maine. The noticeable feature in this count is the large number of erythrocytes. In fact, we find frequently that the bone marrow attempts to raise the total content of hemoglobin in the peripheral blood by sending out a larger number of erythrocytes than normal, each one of which is carrying a smaller load of hemoglobin than normal. In this case each erythrocyte was carrying 0.77 of its normal load of hemoglobin; but the larger number of erythrocytes in the circulating blood raised the total content of hemoglobin to 93 per cent. Erythrocytes, 6,000,000; leucocytes, 8,640; ratio, 1-692; hemoglobin, 93 per cent. (Sahli); color index, 0.77. Differential count: Polymorphonuclear neutrophiles, 69.4 per cent.; lymphocytes, 24.6 per cent.; large mononuclears, 1.4 per cent.; transitionals, 1.0 per cent.; eosinophiles, 2.2 per cent.; basophiles, 0.6 per cent.; myelocytes, 0.8 per cent.; total, 100.0 per cent. Polychromatophilia.

In contrast to the chloranemias, we have the anemias of the pernicious type. These anemias are characterized by a very great reduction in the number of red cells and a less reduction in the amount of hemoglobin, so that the load of hemoglobin carried by each erythrocyte is larger than normal, giving a high color index. Leukopenia is the typical condition of the leucocytes in cases of this sort. The differential count in the anemias of the pernicious type should show an increase in the lymphocyte percentage. Small numbers of myelocytes are usually present. The stained blood shows very marked changes in the erythrocytes; various forms of nucleated red cells and alterations in size (anisocytosis), shape (poikilocytosis), and in staining (polychromatophilia) are to be seen.

The large erythrocyte with a vesicular nucleus and polychromatophilic cytoplasm, known as the megaloblast, has been thought to be the essential feature for the diagnosis of this form of anemia; but if all of the features of the blood picture are present, except megaloblasts, the diagnosis could still be made.

CASE VI.—Female, *et.* thirty-four, a patient of Dr. A. A. Eshner, in the Polyclinic Hospital, Philadelphia (33187). Erythrocytes, 2,010,000; leucocytes, 3,920; ratio, 1-512; hemoglobin, 50 per cent. (Fleischl); color index, 1.24. Differential count: Polymorphonuclear neutrophiles, 26.8 per cent.; lymphocytes, 40.2 per cent.; transitionals, 20.6 per cent.; eosinophiles, 8.4 per cent.; basophiles, 0.4 per cent.; myelocytes, 3.6 per cent.; total 100.0 per cent. In counting 500 leucocytes, 2 normoblasts were seen. Anisocytosis and poikilocytosis.

This is a typical pernicious anemia blood count with the exception of megaloblasts. In the presence of such a blood picture the diagnosis of pernicious anemia is justifiable. Five months after this count, the following count was made in the same patient: Erythrocytes, 656,000 (average of three counts); leucocytes, 6,960; ratio, 1-94; hemoglobin, 16 per cent. (Fleischl); color index, 1.21+. Differential count: Polymorphonuclear neutrophiles, 28.8 per cent.; lymphocytes, 43.0 per cent.; large mononuclears, 25.6 per cent.; eosinophiles, 0.2 per cent.; myelocytes, 2.4 per cent.; total, 100.0 per cent. Anisocytosis, poikilocytosis. In counting 500 leucocytes, 9 normoblasts and 4 megaloblasts were seen.

This examination was made, just before transfusion of blood from the patient's husband, by Dr. G. M. Dorrance. The patient lived six or seven months after the operation and finally died of the disease. The writer has numerous counts which show the hematoblastic showers which occur in these cases. It is seldom that one sees such a low erythrocyte count.

CASE VII.—Female, *et.* seventy-one, referred to the writer by Dr. John Zimmer. The chief complaints were pain on swallowing and sialorrhea. The patient had lost 20 to 25 lb. of weight within six months and was markedly cachectic in appearance. The physical examination showed dilatation of the heart, a slightly enlarged area of liver dullness and an irregular pulse. The writer gave the opinion that the patient probably had carcinoma of the esophagus. Dr. George G. Carroll passed an esophagoscope without difficulty. Erythrocytes, 2,110,000; leucocytes, 12,560; ratio, 1-167; hemoglobin, 60 per cent. (Sahli); color index, 1.42. Differential count: Polymorphonuclear neutrophiles, 72.2 per cent.; leucocytes, 24.4 per cent.; large mononuclears, 0.4 per cent.; eosinophiles, 1.6 per cent.; basophiles, 0.2 per cent.; myelocytes, 1.2 per cent.; total, 100.0 per cent. Anisocytosis, polychromatophilia, granular degeneration. One intermediate nucleated erythrocyte seen in counting 500 leucocytes.

The blood count is not typical of pernicious anemia, on account of the slight leucocytosis and the increase of the polymorphonuclear percentage. Many counts of this type have been recorded in cases of concealed carcinoma. About three weeks after the first count was made a second count gave the following result: Erythrocytes, 2,090,000; leucocytes, 7,040; ratio, 1-296; hemoglobin, 61 per cent. (Sahli); color index, 1.45. Differential count: Polymorphonuclear neutrophiles, 52.4 per cent.; lymphocytes, 41.6 per cent.; large mononuclears, 1.6 per cent.; eosinophiles, 4.2 per cent.; basophiles, 0.2 per cent.; total, 100.0 per cent. Anisocytosis, polychromatophilia, granular degeneration.

This is more typical of pernicious anemia than the first count made. The leucocytes are below normal, there are a lymphocytosis and a high color index. About two months after the patient was first seen she had a sudden attack of pain in the right upper abdominal quadrant, exactly similar to an attack of

gall-stone colic, but without jaundice. Dr. Fred W. Zimmer, who had seen the patient before and had given the opinion that there was trouble below the diaphragm, probably carcinoma, considered the advisability of an operation. But on account of the blood condition and the fact that the urine contained albumin and casts, it was decided not to operate. Under medical treatment the pain entirely disappeared, and the patient when last seen was very comfortable. Other blood counts were made at two and three weeks' intervals. Table I summarizes the results of the blood studies in this case.

The last examination made shows nearly all the features of an anemia of the pernicious type, except that the leucocytes are too high and the lymphocytosis is not marked. There is a marked improvement in the condition of the blood on this examination over that of the first examination. The question which is as yet unsolved is whether this is a case of true pernicious anemia or a secondary anemia of the pernicious type dependent on a concealed carcinoma.

CASE VIII.—Female, *æt.* sixty-four, seen in consultation with Dr. J. P. Flemming. The patient's chief complaint was "weakness in the stomach," with nausea and vomiting. She had never vomited blood. She was very anemic and had lost a great deal of weight. The only abnormality that could be detected upon physical examination was the presence of a hemic murmur at the base of the heart. Erythrocytes, 3,460,000; leucocytes, 4,080; ratio, 1-848; hemoglobin, 72 per cent. (Sahli); color index, 1.04. Differential count: Polymorphonuclear neutrophiles, 11.8 per cent.; lymphocytes, 84.0 per cent.; large mononuclears, 3.0 per cent.; transitionals, 0.2 per cent.; eosinophiles, 1.0 per cent.; total, 100.0 per cent. In counting 500 leucocytes, one nucleated red cell of the intermediate type was seen. Anisocytosis and poikilocytosis. This is an anemia of the pernicious type with higher lymphocyte percentage than usual. The opinion was given that this patient, also, was probably suffering from a concealed carcinoma.

CASE IX.—Male, *æt.* twenty-seven, referred to the writer by Dr. N. D. McDowell. His chief complaint was exophthalmos. He had felt bad since an attack of typhoid fever in the autumn of 1911. He complained of dyspnea and palpitation of the heart. His thyroid body was palpable, his pulse was 84 in the recumbent and 116 in the erect posture. Erythrocytes, 5,890,000; leucocytes, 8,000; ratio, 1-736; hemoglobin, 94 per cent. (Sahli); color index, 0.79+. Differential count: Polymorphonuclear neutrophiles, 48.4 per cent.; lymphocytes, 45.2 per cent.; large mononuclears, 2.8 per cent.; eosinophiles, 3.0 per cent.; basophiles, 0.6 per cent.; total, 100.0 per cent. In this blood there is a marked lymphocytosis with a decrease in the percentage of polymorphonuclear neutrophiles. The blood, however, is not of the pernicious type. The erythrocytes are more than 5,000,000; the color index is less than 1.0. It has been shown, comparatively recently, that cases of exophthalmic goitre are associated with a lymphocytosis and this gives us one more link in the chain of evidence for the diagnosis of that disease.

Within the last six months, the writer has seen 3 cases of obscure chronic disease which have had the following hematological characteristics: An increase in the number of erythrocytes, a normal leucocyte count, or a leukopenia, a low color index, and a relative lymphocytosis. None of these patients had demonstrable organic disease; none had had syphilis; all were males.

CASE X.—*Aet.* fifty-four; complained of nervousness and irritability. There was a previous history of a severe attack of measles, diphtheria, scarlet

fever, dysentery, pneumonia and general rheumatic pains with a definite attack of sciatica. He was in the habit of eating more carbohydrate than proteid food. He was a rather steady user of alcoholics and had been a heavy smoker. The physical examination showed dilatation of the heart, with a weak heart muscle, low blood-pressure, and slow pulse. The blood-pressure determination gave: Systolic, 112; diastolic, 82; pulse-pressure, 30. The pulse-rate was 66 in the recumbent and 86 in the standing posture. The patient was somewhat overweight. Table II gives the details of the blood examinations.

CASE XI.—*Aet.*, fifty-eight; chief complaint, weakness. He had a previous history of a questionable malarial attack fifteen or twenty years before, associated with arthritis; he had had a severe attack of scarlet fever, and he was habitually constipated. A physical examination showed a weak heart muscle, with low blood-pressure, and slow pulse. The blood-pressure observation showed: Systolic, 118; diastolic, 76; pulse pressure, 42. His pulse was 62 in the recumbent and 72 in the upright posture. His urine contained a moderate number of hyaline casts without albumin. He had a chronic arthritis in some of his finger-joints. Table III gives the details of the blood examinations.

CASE. XII.—*Aet.*, thirty-six. His chief complaint was nausea and vomiting and anorexia with gas. He had a previous history of fright followed by a marked neurasthenia, and he had had scarlet fever and appendicitis. He was in the habit of eating more carbohydrate than proteid food. He had been a somewhat constant beer drinker and his sexual power was lost. The physical examination showed psoriasis, palpable cervical lymph-nodes, dilatation of the stomach, and an enlarged area of liver dullness. His urine contained an increased amount of indican and a large number of crystals of calcium oxalate. Table IV gives the details of the blood examinations.

It was impossible to make a diagnosis in these cases. The physical examination did not reveal sufficient organic disease to account for the blood condition. All three, however, could be classed as patients suffering from a disturbance of metabolism. The blood picture is similar to that seen in cases of splenic anemia. But none of these patients had an enlarged spleen; and according to the textbooks, in splenic anemia the enlarged spleen makes its appearance before the anemia is seen.

After figuring the absolute number of lymphocytes and polymorphonuclears per cubic millimetre in these bloods, it will be seen that the reduction in the total number of the latter form of leucocytes is more striking than the increase in the former variety. In fact, in several instances the total number of lymphocytes per cubic millimetre is within the normal range—2,000 to 3,000. In one instance, the absolute number of lymphocytes per cubic millimetre is below the low normal. On the other hand, the absolute number of polymorphonuclear neutrophiles is below the low normal, 6,200, in every case.

It will be noted that there is some improvement in the blood picture in the latest examination of each one of these patients. Each one received arsenic, iron, and strychnine, to which, if to any medication, the improvement can be ascribed.

COLLOIDAL SOLUTIONS AND THE THERAPEUTIC APPLICATION OF ELECTRIC COLLOIDS.

By CHARLES HUGH NEILSON, M. D., of St. Louis.

Jacques Loeb says the material of which living organisms consists is essentially colloidal in its character. He says life depends upon the existence of colloidal solutions in the cells. These colloids or colloidal substances in living matter exist in a liquid as well as in a solid condition.

Graham classified soluble substances into colloids and crystalloids. The crystalloids diffuse readily through animal membranes. Such substances as acids, bases and salts are crystalloids. Colloids, on the other hand, diffuse through animal membranes with difficulty, or not at all. Nearly all proteins, some carbohydrates as starch and the higher dextrans, are colloids.

The term 'colloid' was coined by Graham because glue (colloid) belongs to this group, and because the colloids are similar to glue in many of their physical characteristics. As colloids exist in different physical conditions, Graham coined the words 'sol' and 'gel.' Colloids may exist in solution or in a state of fine suspension, and are called 'sols.' They exist in a jelly-like coagulated or precipitated form and are called 'gels.'

This classification of Graham seemingly separates substances into two clearly defined classes, the colloid and the crystalloid. Graham undoubtedly felt that the separation was distinct. We now know, however, that between a colloid at one end and a crystalloid at the other, there are many substances which have properties of the one or the other. Certain proteins, which in Graham's time were considered never to form crystals, can now be crystallized, and thus a typical colloid of Graham is transformed into a crystalloid. In Nature we see crystalloids transformed into colloids. For example, dextrose is transformed into glycogen in the liver. The dextrose is dehydrated and condensation takes place. These changes are purely chemical. There must also be a physical change, as glycogen in solution is a typical colloidal solution. Lecithin is a colloid and forms colloidal suspensions. It is formed from cholin, phosphoric acid and stearin. The first two substances are crystalloids, while stearin is a fat.

In spite of the above statements, there are marked differences between colloids and crystalloids. Colloids are generally amorphous, and crystalloids are not. Colloids are non-diffusible, while crystalloids diffuse readily. Colloids do not exert osmotic pressure, which is powerful in crystalloids.

Noyes divides colloids into two classes:—

1. Those which are viscous, gelatinizing and not easily precipitated by salts. These are colloidal solutions.
2. Those which are not viscous, non-gelatinizing and readily precipitated by salts. These are colloidal suspensions.

Mueller classifies colloidal solutions as follow:—

1. Suspension colloids, *e. g.*, metallic hydrosols.
2. Solutions of high molecular weight and combinations, *e. g.*, proteins.

Ostwald classifies colloids as follow:—

1. Emulsion colloids.
2. Suspension colloids.

The emulsion colloid is a colloid formed by the mixture of two liquid phases. The suspension colloid is formed by the mixture of a solid with a liquid phase. The emulsion colloid of Ostwald corresponds to class 1 of the Noyes' classification, while the suspension colloid of Ostwald corresponds to class 2 of the Noyes' classification.

Egg albumin is an emulsion colloid, but this can be transformed into a suspension colloid, as Hardy has done. Hardy took fresh egg albumin and diluted it nine times with distilled water, and then filtered the solution. The filtrate was clear and transparent. He heated the solution slowly and it became opalescent, which is generally the color of organic suspension colloids. This solution is his colloidal solution of albumin. He demonstrated the fine suspension of the albumin, as well as its electrical condition, as follows: When the solution is either faintly acid or alkaline, that is when the particles are charged with a positive or negative charge, it remains permanent. When it is perfectly neutral, it precipitates. He also proved its electrical nature by placing some of the solution, when acid, in a current. The particles collected at the negative pole and vice versa when the solution was faintly alkaline.

Inorganic substances may also exist in a colloidal condition. The colloidal solutions of inorganic substances, such as metals, are not really solutions, but merely suspension of fine particles in a liquid or, as the physical chemist would say, a system of two phases. These particles are so fine that under the original condition in which they are formed they do not obey the law of gravity and do not sink in the liquid. To this class of colloids belong the electric colloids of platinum, gold, silver, etc. The colloidal solutions are named 'metallic sols'; for example, platinum sol, etc. These so-called metallic colloidal solutions of the heavy metals are named electric colloids because they are made by the disintegrating action of the voltaic arc on metallic electrodes when these are placed in distilled water. The electric current passing through the metal when it is in contact with the distilled water, which has a high resistance, causes the metal to dissolve or break up into small particles which remain suspended. These solutions are called hydrosols, because the suspension

is in water. The solutions are called electric colloids, in the second place, because each particle of the fine suspension is said to have a definite electrical charge. That they have this electrical charge can be demonstrated by passing a current through the solution which causes the particles to migrate to the cathode or anode, depending upon whether the solution is acid or alkaline in reaction.

Graham originally did not have the idea that colloids were suspensions of fine particles in a liquid. However, to-day, when the physical chemist speaks of colloidal solutions of inorganic substances, he means this fine suspension of substances in a liquid.

Bredig was the first to make the metallic colloids and to demonstrate that they are suspension of fine particles in a menstruum. He worked on the inorganic solutions, especially the hydrosols of the heavy metals.

The method of Bredig for making these metallic colloids, as already described, is a method for making these solutions and is the one generally used. It gives a colloidal solution which is free from all impurities. The method is the same for all metals. Another method of making these colloidal solutions is the chemical method. This method varies for each metal. It is done by the action of some reducing agent acting on a given metal. For instance, collargol is made by reducing silver nitrate with a mixture of ferrous sulphate and citrate of soda. This chemical method gives a solution which is never pure, and is, therefore, not so satisfactory for experimental purposes. The chemical method of making the metallic colloids does not give a true colloidal solution as is meant by Bredig's electric colloids. Collargol, especially, which has been so widely used and advertised is not a true colloid of mercury and differs in many ways from electromercuriol. The metallic electric colloids prepared, according to Bredig, are unstable. They are precipitated by salts, proteins, blood-serum, lymph-tissue extracts, and debris. For this reason, when these colloids are injected into the body, the fine particles in the colloids are precipitated and can be found in the tissues, as shown in the tubules of the kidney by Mayer and Stodel.

Because of this ease of precipitation, Iscovesco, Ascoli and Izar added to these unstable colloids small quantities of organic colloids as gelatine, starch paste, etc. They found that one cubic centimetre of electric metallic colloids, which was precipitated by one drop of blood serum, did not precipitate when gelatine, etc., were added. These stable colloids, made isotonic with the blood by adding sodium chloride and sterilized, are on the market and are known as electrargol, electraurrol, electroplatinol, electropalladiol, etc. Robin and Bardet say this stabilizing, sterilizing and making them isotonic lessens their activity as catalyzers. They always employ the unstable Bredig solution.

The therapeutic use of these colloidal metals was undoubtedly suggested by studying their behavior when used in the broadest biological sense. Many of the body functions are brought about by enzymes. These

enzymes act as catalytic substances, that is they accelerate a slowly progressing chemical action. The manner in which this catalysis is done is still in dispute, but it is probably a contact phenomenon. These catalyzers do not themselves enter into the reaction, but remain apparently unchanged during the course of the reaction. Again the mass of catalyzer is comparatively small as compared with the results produced. Again the rapidity of the reaction bears a direct ratio to the quantity of the catalyzer used.

These metallic colloids are catalyzers; and Bredig was the first to show a relation between these metallic hydrosols and the body enzymes. Bredig says the catalysis of hydrogen peroxide by the metallic colloids is a prototype of all enzyme action, that is, it is catalytic. The metabolic processes of the body are carried on by action and interaction of enzymes. These enzymes according to Bredig and others act catalytically in a manner comparable to the action of these metallic colloids. What then would be the action of these metallic colloids when injected into the body?

EFFECT ON METABOLISM.

Ascoli and Izar and others injected subcutaneously and intravenously small quantities of stable colloidal silver and platinum. They found a considerable increase in the nitrogen output, especially an increase in the uric acid. The phosphorous metabolism was unchanged. In some cases the temperature was raised and the pulse accelerated. By mouth and rectum, larger quantities produced very little effect.

EFFECT ON AUTOLYSIS.

Ascoli and others found that autolysis of the liver was greatly accelerated by the addition of colloidal solutions of gold, silver and platinum.

EFFECT ON THE BLOOD.

Robin and Weil found that, after the injection of colloidal metals, there is a breaking down of leucolysis of the white cells of the blood, which sets in one to two hours after the injection and continues for twenty-four hours. This degeneration is at the expense of the polynuclears, but to some extent affects the lymphocytes. After some hours there is a leucocytosis which is often very pronounced.

EFFECT ON BACTERIA.

Charrin, Henri and Monierd-Vinard found that small quantities of colloid silver greatly increase the development of color in the *B. pyocyaneus*, when the quantities of silver are too small to have a bactericidal effect. Cernovodeanu and Henri found that colloidal silver has a decided bactericidal effect, but that this effect is the more pronounced the finer the particles of silver. Different kinds of bacteria show different resisting power to the bactericidal effect of colloidal silver. These in-

investigators suggest the use of colloidal silver to differentiate *B. coli* from *B. typhosus*. Waitz says stabilized isotonic solutions of metallic colloids are negatively charged and act catalytically. The colloidal metals have marked bactericidal properties and concentrations of 1/50,000 colloidal silver kill—*B. anthrax*. A pneumococcus culture with 1/100,000 colloidal silver added becomes sterile. According to Cernovodeanu and Henri, small quantities of colloidal silver greatly retard the growth of *B. typhosus*, staphylococcus albus, *B. dysenteriae* of Flexner, and many others. Charrin and Monierd-Vinard say 1/50,000 colloidal silver keeps a culture of pneumococcus sterile. They found that white rats inoculated with pneumococcus and treated with colloidal silver do not die. Foa and Aggazzotti show the same thing in rabbits. Streptococcus, staphylococcus, and typhoid organisms are innocuous provided the injection of colloidal silver is made immediately after the inoculation with the organism. Foa and Aggazzotti found that colloidal silver protects rabbits against tetanus and diphtheria antitoxin in doses six times larger than the lethal dose. Stodel and Cernovodeanu say that colloidal mercury is more bactericidal than bichloride of mercury.

EFFECT ON OXIDATION AND THE OXIDASES.

Robin and Bardet tried metallic colloids—the so-called artificial oxidases—on the oxidation processes in fevers. They claim there is an increase in the oxidation processes. This increase of oxidation is shown by the increased elimination of nitrogen, urea, uric acid, indoxyl, etc.

The biological properties of these metallic colloids suggested their therapeutic use. This is a natural result when we consider their bactericidal power, their increase of oxidation and of metabolic processes, their power of hastening autolysis, and their increase of white cells, or the production of leucocytosis when injected into the blood. Waitz used colloidal silver in lobar pneumonia and claims excellent results. He made intramuscular injections of 5 c.cm. He repeated this daily and in all gave about 30 c.cm. Izar treated 30 cases of pneumonia with metallic colloids, and derived the impression that the cause of the disease was favorably influenced; especially was there a good effect on the temperature and subjective feelings of the patient. The heart and kidney activity was uninfluenced as was also the sodium chloride excretion. In rheumatism and typhoid fever there was no effect. In 3 cases of septicemia the results were worthy of consideration. Bousquet and Roger found that injections of electrargol in a case of septicopyemia gave favorable results. In 2 cases of puerperal septicemia injections of electropalladiol gave good results.

At the same time Stodel, in Paris, and Charpentier and Guilloz, in Nancy, tried electrocolloidal mercury in syphilis. The solution was injected under the skin in doses of one cubic centimetre. They found no intolerance or stomatitis when as much as 50 c.cm. were given in a day.

Twenty-one cases were treated with success by Golup and Stodel. The injections were made intramuscularly in quantities of 1-3 c.cm. of a solution containing 25 to 50 parts of mercury per 1,000. Bousquet and Roger, and many other investigators, particularly the French and Italians, have tried the systemic effect of electric colloids on nearly every disease. Their reports and statements as to the value of these electric colloids, therapeutically, are very conservative. Some authors speak in high terms of their use in disease, but when these same authors say in their reports, that they have the impression or think that electric colloids have a distinct therapeutic value, one feels an uncertainty about using them. Nearly all this work from the therapeutic standpoint was done in the years 1906-07-09. Since that time we find very few reports and articles appearing concerning the use of these electric colloids. This fact speaks against a very enthusiastic belief in a wide and distinctive therapeutic use of these preparations.

SUMMARY.

1. The surface to be grafted should be prepared with a knife, not with a curette.
2. Bleeding from the prepared surface should be controlled with pressure with dry gauze, heat and moisture being avoided.
3. The grafts should be transferred without the use of moisture of any kind.

BIBLIOGRAPHY.

- ¹ Ascoli and Izar: Physicopathological Action of Colloidal Metals in Man. (*Berl. klin. Wochenschr.*, Vol. XLIV, pp. 659-662, 1907; *ibid.*, No. 21, 1907.)
- ² Ascoli and Izar (*Biochemische Zeitschr.*, Vol. V, pp. 394-409, 1907).
- ³ Ascoli and Izar: Action of Inorganic Colloids in Autolysis. (*Biochemische Zeitschr.*, Vol. XVII, pp. 361-394, 1909.)
- ⁴ Ascoli: Action of Colloidal Metals in Liver Autolysis. (*Biochemische Zeitschr.*, Vol. XVII, pp. 361-394, 1909; *ibid.*, Vol. XVII, p. 226, 1908.)
- ⁵ Izar: Therapeutic Action of Some Inorganic Hydrosols. (*Zeitschr. fuer klin. Med.*, Vol. 68, p. 471, 1909.)
- ⁶ Graham (*Phil. Trans. Roy. Soc.*, 1861).
- ⁷ Bousquet and Roger: Physicochemical and Biological Study of Colloidal Metals. (*Rev. de Médecine*, No. 12, pp. 1041-1075, 1908.)
- ⁸ Bousquet and Roger: Contribution to the Therapeutic Study of Colloidal Metals: Their Action in General Infection. (*Rev. de Médecine*, Vol. 28, p. 1075, 1908; *ibid.*, Vol. 29, Nos. 2 and 6, 1909.)
- ⁹ Robin and Weil: Action of the Metallic Ferments on the Blood-Cells. (*Les Nouveau Remèdes*, Vol. 21, p. 337, 1905.)
- ¹⁰ Foa and Aggazzotti: Physiological Action of Colloidal Metals. (*Biochemische Zeitschr.*, Vol. XIX, Nos. 1 and 2, 1909.)
- ¹¹ Foa and Aggazzotti: The Physiological Action of Colloidal Metals. (*Giorn. R. Accad. Medicin Torino*, Vol. 70, Nos. 7 and 8, 1909.)
- ¹² Foa and Aggazzotti: The Physiological Action of Colloidal Metals. (*Archiv Ital. Biologie*, Vol. 49, p. 300-05, 1908.)

- 13 Axenfeld: Colloidal Metals as Physiological Reagents. (*Zentralbl. fuer Physiologie*, Vol. 22, p. 727, 1908.)
- 14 Robin and Bardet: Action of Colloidal Metals and Artificial Oxidases in the Evolution of Infectious Diseases. (*Comp. Rend.*, Vol. 138, p. 738, 1904.)
- 15 Bardet: The Physical and Chemical Properties of Solutions of Colloidal Metals in Reference to Their Therapeutic Application. (*Bull. générale de Therapeut.*, Vol. 153, p. 801, 1907.)
- 16 Gompel and Henri: The Presence of Colloidal Silver in the Bile, Urine and Pancreatic Juice; Its Absence in the Cephalorrhachidian Fluid. (*Soc. Biologie*, Vol. 61, p. 488, 1906.)
- 17 Gompel and Henri: Physiological Action of Colloidal Silver. (*Soc. Biologie*, Vol. 61, p. 362, 1906.)
- 18 Gompel and Henri: The Search for Silver in the Blood and Tissues after Injection of Colloidal Silver. (*Soc. Biologie*, Vol. 61, p. 389, 1906.)
- 19 Waitz: Use of Electric Colloidal Metals in Infectious Diseases, Especially in Bronchopneumonia and Pneumonia. (*Med. Klin.*, No. 9, 1909.)
- 20 Iscovesco: Action of Blood-Serum on the Colloidal Metals Depending on Their Stability or Non-Stability. (*Soc. Biologie*, Vol. 63, p. 37, 1907.)
- 21 Charrin, Henri and Monierd-Vinard: Action of Colloidal Silver Solution on the *B. Pyocyaneus*. (*Soc. Biologie*, Vol. 61, p. 120, 1906.)
- 22 Cernovodeanu and Henri: Action of Colloidal Silver on Certain Pathogenic Microbes. (*Soc. Biologie*, No. 61, p. 122, 1906.)
- 23 Pesci: Contribution to the Study of the Therapeutical Use of Colloidal Metals. (*Giorn della R. Acc. di Med.*, Vol. XIII, Nos. 7-8, 1908.)
- 24 Luzzato: The Behavior of Collargol and Certain Colloidal Silver Salts in Animals. (*Archiv. Farmacologie*, Vol. XIV, No. 1, 1908.)
- 25 Netter: Characteristics of the Old and the New Preparations of Collargol. (*Soc. Biologie*, Vol. 61, p. 126, 1906.)
- 26 Hamburger: Catalytic Action of Colloidal Silver in the Blood. (*Archiv. Internationale de Physiologie*, Vol. 1, pp. 145-151, 1905.)
- 27 Mayer and Stodel: Histological Examinations of the Kidneys After Injecting the Blood with Colloidal Metals. (*Soc. Biologie*, Vol. 58, p. 712, 1904.)
- 28 Paal and Amberger: The Activating of Hydrogen by Colloidal Palladium. (*Chem. Berichte*, Vol. 38, pp. 1406-09, 1905.)
- 29 Breccia: Action of Serous Extravasations on Hydrosols. (*Berl. klin. Wochenschr.*, No. 34, 1910.)
- 30 Fillippi: The Properties of Electric Colloidal Metals. (*Lo. Speriment*, Vol. 62, Copy 4.)
- 31 Garrigou: Colloidal State of Metals in Mineral Waters: Natural Oxidases, Their Therapeutic Action. (*Comp. Rend.*, Vol. 138, pp. 1067-1068, 1904.)
- 32 Ostwald: Grundriss der Kolloidal-Chemie. 1911.
- 33 Bredig: Anorganische Fermente. Leipzig, 1901.
- 34 Hardy: Colloidal Egg Albumin. (*Journ. of Physiology*, Vol. 24, p. 288, 1899.)
- 35 Mueller: Classification of Colloids. (*Zeitschr. fuer Anorganische Colloide*, Vol. 36, p. 3, 1903.)
- 36 Porges: The Importance of Colloid Chemistry in Medicine. (*Zeitschr. fuer Chemie und Industrie der Kolloide*, Vol. V, p. 301, 1909.)
- 37 Noyes (*Journ. of Amer. Chemical Soc.*, Vol. XXVII, p. 85, 1905.)
- 38 Ostwald (*Zeitschr. fuer Chemie und Industrie der Kolloide*, Vol. I, p. 291-331, 1907.)

ADENOIDS.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P., of London, Eng.

Of all the root-problems that have exercised man's mind, there is not one concerning which we have not been divided into sharply opposed camps. And it is pretty certain that there is, in most, if not all of us, some innate determinant which settles for us, not only the side that we may take in any controversy concerning principles, but the mental attitude with which we may approach any interpretation of facts. Indeed, it is not unlikely that men become at loggerheads in logomachies, by reason of some deviation of the physiological balance to this side or to the other. It is certainly true that when Gilbert wrote: "Every child that's born into this world alive, is either a little Liberal or a little Conservative," he expressed a truth greater than he knew.

Thinking men have ever been divided into autocrats and democrats, communists and individualists, materialists and idealists, nominalists and realists. It may from time to time have seemed, as if, some would say, by *Zeitgeist*, or others, by the dominance of some superman, that the tide of thought or belief has set forever in one direction or the other; but sooner or later the flood has ebbed. Action and reaction are eternally opposed, and cyclic change meets us on all sides. Anabolism is not more vital than is katabolism; there is no flexion that is not opposed by extension; and the progress of a wave is as dependent on its rise as on its fall. And healthy thought, no less than healthy action, involves a perpetual sequence of opposites.

So, in medicine, the schools of Cos and of Cnidus have ever struggled for mastery; now the humoralists, and now the solidists, have seemed supereminent.

Since Schwann and Virchow gave us the doctrine of the cell, perhaps the solidists have mostly held sway; perhaps too, in the medical sciences we have been influenced overmuch by the critical, analytical, and organic spirit of the Teutonic races. But nothing is more remarkable to-day than the renaissance of humoralism, presided over by the imaginative, synthetic, and sanguine genius of the Latins.

It may be asked, What has this to do with adenoids? If a youngster has a stuffy nose and running ears, hook the adenoids out, and be done with them, humoralists, and solidists too.

Well, in this matter of adenoids we have all been solidists long enough. We have believed that, somehow or another, adenoids depend on some mechanical causes or conditions: a badly shaped palate, or the use of the

"comforter." We have ascribed, too, their ill-effects to mechanical impediment to respiration, and we have explained the improvement that follows their ablation, to the clearance of the fairway. But there is another side to the picture. Many French and Italian physicians see in adenoids a reaction to a "toxic"—that is to say, a humoral influence; they refer the symptoms, or many of them, to humoral, or polyglandular disturbance; and they ascribe the improvement that follows operation to a rectification of this balance, and they seek to assist it by opotherapy.

Pistre, in an excellent essay that occupied the issue of July 6th, 1912, of the *Revue Hebdomadaire de Laryngologie, d'Otologie, et de Rhinologie*, defines "adenism" as a hyperplasia of the pharyngeal lymph-tissue which is an outward and visible sign of defensive struggle, on the part of the organism, against an hereditary or acquired intoxication operating at a very early stage of individual growth. Such an intoxication is not necessarily to be considered as a simple one, or even as depending on biological changes in the blood induced by micro-organisms; we may have to seek it in humoral alterations that depend on change in the balance of the internal secretions of many glands.

It may seem that this is but a wild speculation, but Poppi, an Italian observer, in 1910, published a book in support of an hypothesis with which we have to reckon. Now, in England, at any rate, the idea of the pharyngeal hypophysis has hardly taken hold of the medical imagination. Yet, so long ago as 1907, Civalleri and others, following up the work of Erdheim and Habermeld, showed that there is present during almost the whole of life in the pharyngeal vault, in the region of the vestiges of the external opening of the craniopharyngeal canal, a band of tissue that, in structure, corresponds almost exactly with the anterior lobe of the pituitary, and that, later in life, tends to become encapsuled. This "accessory hypophysis," for so it is, seems to have a say sometimes in the production of acromegaly; and is sometimes accompanied by persistence of the canal itself, though that is another story. But Poppi believes that there is a definite connection between this pharyngeal hypophysis and "adenism," and suggests that in "adenism" there is, if not actual patency of the canal, at any rate, through the peculiar vascular arrangements, an unusual communication between the accessory and primary hypophyses, with consequent disturbance of the interglandular exchange or balance. In fact, Poppi insists that, in adenism, there is an affection of the whole group of structures—bony, glandular, lymphoid, and vascular—in the pharyngeal vault and the base of the skull; a position which should be collated with the recently expressed views of Bertolotti. And Pistre himself, though he regards the views of Poppi as perhaps suggestive rather than definitive, agrees that the presence of adenoids constitutes only one of the elements in a symptom-complex that, in its completest form, appears as the *maladie rachitique*, with affection first of the bony skeleton, then of the lymphoid structures, and later of the liver and spleen. So

that Pistre, as a good humoralist, recognizes symptoms set up by the adenoids themselves, partly depending on their acting as septic *foyers*, and partly on chronic poisoning by carbonic acid excess in the blood, at the same time that he recognized their participation in an interglandular syndrome, in which not only the hypophysis and its accessory, but the thyroid and the thymus, if not the pineal, are also concerned.

So that we begin to see, dimly foreshadowed, the reasons why some French physicians group together as "dysostoses," such diseases and conditions as acromegaly, achondroplasia, "rachitism," oxycephaly, mongolism, and cretinism, since in them we have apparently the pineal gland, the pituitary, the pharyngeal organ-complex (Luschka's tonsil, Wald-eier's ring, the accessory hypophysis, the craniopharyngeal canal and the vascular structures thereabouts) variously involved, together with the thyroid, the thymus, and the sex-organs; setting up skeletal changes and glandular dystrophies, but always apparently in association with some modification of the cranial base, particularly in the region of what Virchow called, long ago, with reference to cretinism, the "tribasilar synostosis."

But there is a practical point.

The neo-humoralists maintain that the speedy improvement that follows the removal of adenoids is not entirely due to the clearing away of septic *foyers*, and hindrance to oxygenation, because (and this is true enough) it does not always occur! They say that the case may have gone too far, or the child may have been too profoundly affected for the polyglandular balance to be at once righted. So that, after adenectomy, and especially in marked cases, we must not only attend to the general health, and order breathing exercises, but we must enjoin a course of combined opotherapy, after the manner of Dupuy.

But the ingenious Poppi, and Citelli with him, have here something to say. They believe that the good effects of adenectomy are due to the fact that, as they think, removal of the adenoids allows normal closure, or suppression, of the abnormal communication between the hypophysis and its accessory, that, *ex hypothesi*, has been delayed, to occur at once. And they seek for further evidence of play and interplay between the lymphoid tissue and the other glands (especially the pineal) in the fact that, at puberty, adenoids automatically tend towards retrogression.

Here again we see some gleams of daylight. For, if at puberty, or when puberty should take place, certain glands, and perhaps particularly the pineal gland, or epiphysis, do not take on proper function, we have then that association of humoral changes that lies at the back of those graver interglandular syndromes, which, one and all, seem to be accompanied by excess or deficiency of sexual qualities.

Well, if the painstaking investigations of laborious observers have given us a vast accumulation of facts, it may be that the time is now coming when the humoralists, with their livelier imaginations, will show us how,

by a justifiable use of hypothesis, these facts may be co-ordinated. The isolated glandular organs in the body are brought into relation with each other through the less stable and more fluid media; and the harmonious working of the organism depends, not only on its tissues and its cells, but on its sera and its solvents. So too, advance in science does not depend on the accumulation of facts alone. The solvent of hypothesis—the scientific use of the imagination—is needed to bring the facts into relation with each other.

BIBLIOGRAPHY.

Tamburini (*Riv. Sper. di Freniatria*, Vol. III, 1911).

Tamburini (*Universal Medical Record*, p. 23, January, 1911; p. 118, February, 1911; p. 540, June, 1911; p. 46, July, 1911; August, 1911).

Bertolotti (*Nouvelle Iconographie de la Salpêtrière*, January, February, March, April, 1912).

Poppi (*Rev. Hebd. de Laryn., d'Otol. et de Rhin.*, July 6th, 1912).

Crookshank (*Lancet*, p. 1718, June 22nd, 1912).

Hutinel and Harvier (*Archives de Médic. des Enfants*, June, 1912).

EXAMINATION OF THE CEREBROSPINAL FLUID PARTICULARLY WITH REFERENCE TO THE PRECIPITIN REACTION.*

By OSCAR BERGHAUSEN, B. A., M. D., of Cincinnati.

Owing to the importance now being attached to the examination of the cerebrospinal fluid in cases presenting symptoms on the part of the central nervous system, especially when syphilis is suspected as an underlying cause, the following report of cases will be of interest, particularly because of the employment of the precipitin reaction. This method was adopted by the writer to determine its value as a means of differentiating between normal and abnormal fluids. No mention could be found in the literature of this reaction having been employed for that purpose.

The serum was prepared by injecting a rabbit with increasing amounts of cerebrospinal fluid, obtained from a case of acute cerebrospinal meningitis after the diplococci had disappeared from the fluid. This was heated to 56° C. for one hour.

A rabbit, weight 1,670 gm., was given, intraperitoneally, 5-20 c.cm. of the above spinal fluid at intervals of from four to thirteen days, and bled ten days after the last injection, four injections being given altogether.

METHOD.

About $\frac{1}{2}$ c.cm. of the spinal fluid to be tested is introduced into a small glass test-tube (No. 3 or No. 4), and 0.2 c.cm. of the specific rabbit serum is allowed to flow in slowly from above. The tubes are then placed in the incubator for half an hour and are then examined. As a rule a distinct cloud forms at the junction of the two fluids in a very few minutes, and can easily be seen by holding the tube against a dark surface. The specific serum employed by the writer gave a titre of 1-100; that is, 0.5 c.cm. of a 1-100 dilution of spinal fluid, obtained from a paretic, gave a distinctly positive ring at the contact point after adding 0.2 c.cm. of the specific serum and allowing to remain at 37° C. for twenty minutes.

By studying the tables given below we find that all spinal fluids give a distinct reaction in the higher concentration. In the lower concentrations, the reaction may or may not be present; its presence, however, not indicating a pathological condition. Normal fluids may still react in a dilution of 1-1,000, although the degree of the reaction may be only slight. It does not necessarily depend upon the degree of the globulin content, because the precipitin reaction may be present in the absence of the latter. Similarly, it bears no relation to the presence or absence of the Wassermann reaction.

*From the Serological Division, Laboratory of the Cincinnati Hospital.

TABLE I.

No.	Diagnosis.	Cell Count 1 mm. 3.	Globulin (Kaplan).	Wasser- mann.	Reduction.	Lueticin (Skin).	Precipitin.
1	Tabes.....	50	+	+++	+	+	+
2	Insular Sclerosis.....	690	+	+	+	+	+
3	Tabes.....	20	+	—	+	0	+
4	Cerebral Thrombosis....	1	—	—	+	0	+
5	Tabes.....	12	+	+	+	0	+
6	Paresis.....	54	+	+++	+	0	+
7	Normal.....	—	—	—	+	0	+
8	Cerebral Hemorrhage....	25 (red cells)	+	—	+	0	+
9	Tabes.....	14	+	—	+	+	+
10	Tabes.....	17	+	+++	+	—	+
11	Paresis.....	free blood (trace)	+	+++	+	0	+
12	Syph. Thrombosis.....	5	+	+	+	0	+
13	Cerebral Syphilis.....	37	+	+	+	0	+
14	Brain Tumor.....	1	—	—	+	0	+
15	Headache Syphilis?.....	22	+	—	+	0	+
16	Paresis.....	12	+	+++	+	0	+
17	Hemiplegia.....	200	+	+++	+	0	+
18	Tbc. Meningitis.....	free blood (trace)	0	0	+	0	+
19	Paresis.....	8	+	+++	—	0	+
20	?	—	—	—	+	0	+
21	Lead Encephalopathy. Lues.....	free blood (trace)	0	—	+	+	0
22	Plumbism.....	—	—	—	+	0	0
23	Gout.....	1	—	—	+	late pus- tule	+
24	Cerebrospinal Syphilis...	free blood (trace)	+	—	+	—	+
25	Paresis.....	32	0	+++	0	0	0
26	Cerebrospinal Fever.....	0	0	0	—	0	+

Explanations:

0=test not performed.

—=negative result.

+=positive result.

±=doubtful reaction.

TABLE II.

Precipitin Reaction with Dilutions of the Spinal Fluid.

Case No.	Undiluted.	Dilutions.		
		1-10.	1-100.	1-1000.
14	+	+	—	—
16	+	+	trace	—
17	+	+	+	trace
18	+	+	+	+
19	+	+	+	+
20	+	+	+	trace
23	+	+	trace	—

CONCLUSIONS.

Examination of the spinal fluid is of the greatest importance, both from a diagnostic and prognostic standpoint, in all instances when symptoms on the part of the central nervous system do not quickly subside. In syphilis of the tract we have practically always an increased cell count, increased globulin, or a positive Wassermann reaction. One or all of these findings may be present. A negative cell count, negative globulin reaction, and a negative Wassermann reaction mean absence of syphilitic involvement of the central nervous system, although another system may be affected. The reduction test with diluted Haines solution is present in practically all cases. In this series of cases it was absent only in one case of paresis (this reaction was repeated), and in one case of acute cerebrospinal fever. In the experience of others it seems to disappear during the height of an acute attack of meningitis, only to reappear when the symptoms become less intense. The precipitin reaction is too delicate for clinical purposes. Its use is still limited to those instances in which we wish to prove that a given fluid or serum is of human origin.

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DIETETIC TREATMENT OF ILEOCOLITIS.

By CLIFFORD G. GRULEE, M. D., of Chicago.

In order properly to estimate the problems to be attacked in a paper of this sort, one must get a definite idea of what the term 'ileocolitis' means. To the writer, an ileocolitis is that stage of a diarrheal attack which follows the acute onset. In other words, following twenty-four to forty-eight hours of high fever, there comes a stage when the infant has eight to ten mucous, curdy, green and sometimes bloody stools a day; the weight continually decreases, but does not show the marked loss which accompanied the onset, and the temperature ranges between 99 and 101° F. It is this class of cases about which the writer wishes to speak. They are altogether too common, and anything which we can do to relieve the suffering of these infants will materially decrease the great infant mortality. There can be little doubt but that the onset of this condition is a true metabolic disturbance. This is proved, if in no other way, by the presence of sugar in the urine.

Just what the nature of the period following the acute onset is must be a matter of controversy. It has been called by many a putrefactive diarrhœa. This is certainly true if one takes into account only the stool, but when we realize that the lesions found post-mortem in these infants are in large part confined to the colon, and that, of the small intestine, only the lower portion of the ileum is usually involved, we see then that the portion of the intestine which carries on practically all the work of absorption of the proteids, fats and carbohydrates is not affected, at least in a gross anatomical way, in cases of ileocolitis, and that that portion which shows the greatest amount of pathology is the colon, from which the water is absorbed to a large extent.

One may well stop here and ask himself whether the symptoms of an ileocolitis are due in large part to the inflammation which exists in the lower bowel, or whether they are due to disturbances of internal metabolism, caused, perhaps, by the absorption from the small bowel, either of elements which are harmful to the organism, or of too great a quantity of elements which would be harmless if absorbed in smaller quantities. It seems to the writer, then, that the question of diet in these cases narrows itself down to the choice of a diet which will not affect adversely the workings of a very much deranged internal metabolism, and which at the same time will form the least suitable medium for a bacterial infection of the colon, if such in truth exists.

There comes now into question what element in the intestine is that in

which putrefactive bacteria grow best. Normally, in the large intestine of the infant, there are present putrefactive bacteria of the acidophile type, which grow in an acid medium. It is altogether likely that the substance for such bacteria to grow in, which, of course, must be proteid in character, is the mucus secreted by the intestinal wall, and not the proteid of the food. If this be true, and it is thought by most writers on the subject to be true, then any food, whether it be proteid, fat or carbohydrate, which causes an irritation of the intestines, either small or large, and thus causes an increase in the flow of mucus, favors the growth of a putrefactive bacterium in the colon. We see, therefore, that our problem is narrowed down still further, and that the second postulate of a food for such cases must be that this food is non-irritating to the large and small intestines. So much for the introductory remarks on this subject.

When it comes to the actual carrying out of this proposition, we will find that the proteid of cow's milk is that food, in all instances, which is the least irritating to the intestine, and, therefore, produces the least secretion of mucus, and which is least disturbing to the internal metabolism. The proteid of cow's milk is best obtained by removing the whey from skimmed milk. The curds, of course, cannot be fed to young infants *per se*. After the whey is removed by means of coagulation of the milk with chymogen or pepsin, the curd is broken up into fine particles by passing through a colander several times. It is then necessary to suspend the curd in some fluid. Up to a few months ago the writer used an arrowroot water, and this gave him satisfactory results. It seemed, however, that it would be of greater value if we could make the food purely proteid in character. For this purpose, after experimentation, it was found that a 5 per cent. gelatine water would suspend the curd very well. The objections to this are two. Although the curd suspends well in the gelatine water, the gelatine seems to be cohesive in its action, combining together several of the small curds and tending to form lumps. It is also necessary, if we have a gelatine solution of sufficient strength, to have one at the same time which solidifies on cooling. It, therefore, requires more heat to liquify this than is desirable, since the curd will coagulate into a hard mass with heat. In spite of these objections, after the initial barley-water period of twenty-four to forty-eight hours, the writer has found that this solution gives very good results. No one, he thinks, can claim that any treatment in ileocolitis gives absolutely satisfactory results, but this latter seems to him to have done better work than any which he has heretofore tried.

It should not be thought, however, that this totally proteid food can be continued indefinitely. At the most, four to five days to a week is as long as it can be used. After this it is well to add a certain amount of buttermilk in place of the gelatine water, and gradually replace the skimmed-milk curds with whole milk curds, gradually getting the child

upon an albumin milk, and then switching on to a whole milk mixture. By this method of treatment, we will reduce very markedly the sugar content of the food.

The method of preparation is much simpler than one would suspect at first. A mother can be taught this in a short time. It requires quite a little work for preparation, and is, of course, objectionable on those lines; but, as a rule, these cases offer such difficulties in feeding that one will be glad to go to any trouble in order to obtain a food which will give good results.

The writer might state, in closing, that he rarely uses drugs of any sort in the treatment of ileocolitis. He has never been convinced that the initial cathartic is of any value, nor does he think that repeated doses of calomel or bismuth, with the idea of sterilizing the colon, really produce results. Drug treatment, if any, is carried out, by the writer, by the use of small doses of paregoric to check a severe watery diarrhea, which is rapidly dehydrating the system. Colonic flushings, too, seem to him to have done more harm than good in most instances, because the mechanical irritation thus produced has seemed to do more harm than was the benefit received by the washing out of the infected matter in the bowel.

We see, then, that this treatment is directed along two lines. The first is to reduce, so far as possible, any metabolic disturbance. The second is, by this reduction, to keep up the general resistance of the child to such a degree that it will be possible for it to overcome whatever infection may be present in the colon.

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OPTOMETRY LEGISLATION IN THE UNITED STATES: WITH
SPECIAL REFERENCE TO THE PROPOSED
MISSOURI OPTOMETRY LAW.

By JOHN GREEN, JR., M. D., of St. Louis.

In many states, legislatures will convene in annual or biennial session in the early part of 1913. As usual, a large number of bills bearing on the material or moral welfare of the people—so-called social legislation—will be introduced. Some of these proposals will have to do with questions of public health, and should greatly interest the members of our profession. One bill, which has been enacted into law in twenty-seven states, will unquestionably be the subject for legislative consideration in many of the states on whose statute books it has not yet been placed. The writer refers to the so-called 'optometry' bill, a measure which aims to license the 'refracting optician' or 'optometrist' to test eyes for glasses. The effort on the part of refracting opticians or optometrists to secure legislative recognition for their trade, or 'profession' as they prefer to call it—thus creating, as it were, a new profession, and one which in some of its attributes comes directly into conflict with the medical profession—has raised a sharp issue between optometrists and physicians.

Definition of Optician and Optometrist.—Let us get clearly in mind the difference between 'opticians' and 'optometrists.' First, there are the manufacturing opticians, usually wholesalers, who grind lenses in large quantities, manufacture mountings of various sorts and sell their products to the retail opticians. The latter are of two kinds: First, 'dispensing opticians,' *i. e.*, opticians who confine their work strictly to the grinding of lenses and the mounting of the same on prescription of oculists; second, 'refracting opticians,' who, in addition to the aforementioned functions, also advertise to "test eyes for glasses." As a matter of fact almost all retail opticians are 'refracting opticians' to a greater or less degree. Some of them, to be sure, make an effort to limit their work in this direction, and seek to refer all customers to an oculist for examination. Their endeavors are often thwarted by the prospective customer, who, rather than go to an oculist for examination and pay the oculist's fee, will visit the rival optical shop across the street where no such 'foolish ideas' about a medical examination of the eyes are advanced. When this view of the matter is presented to the optician, his zeal for an ophthalmological examination suddenly wanes; he puts his customer through some sort of a test and the transaction is concluded by the customer buying a pair of glasses which may or may not measure the refraction of his eyes.

The next class is the 'out-and-out refracting optician' or 'optometrist' as he prefers to be called. 'Optometrist' simply means 'one who measures the eyes,' and was adopted by this class of opticians to distinguish themselves from manufacturing and dispensing opticians. The optometrist, then, is, primarily, a 'tester of eyes.' He may, of course, in his secondary capacity as a retail dispensing optician fill oculists' prescriptions.

Optometry and Optometry Laws.—Optometry is defined (see Section I of any optometry law) as "the employment of any means, other than the use of drugs, for the measurement of the powers of vision and the adaptation of lenses for the aid thereof." Note that the measurement is to be made "without the use of drugs." This is a concession to the popular understanding that, whenever drugs are used or prescribed, this 'practice' in itself constitutes the 'practice' of medicine.

Optometry laws now operative in twenty-seven states are cast in the same mold; there are, of course, minor points of difference, but the main features are identical. Following the definition of optometry comes a section defining the number and mode of appointment of a Board of Examiners in Optometry. Another section provides rules and regulations for the conduct of the Board's business. Still another specifies that optometrists in practice at the time of the passage of the law may secure a certificate by exemption, provided they apply for the same before a given time. Causes for the revocation of license are stated. The balance of the bill concerns itself with the method of recording the license, the amount of fees, the method of handling and dispersing funds, and the fixing of penalties for violations of the regulations of the act. Finally, physicians and opticians who do no 'fitting' are exempt from the provisions of the act.

History of Optometry Legislation in the United States.—The first optometry law was passed by the state of Minnesota in 1901. Up to 1907 optometry bills, practically unopposed, were enacted into law in California, North Dakota, New Mexico, Arizona, Montana, Idaho, Utah, Tennessee, Indiana, and Nebraska. In 1909 these bills met with determined opposition from the medical profession, or, to be more exact, from a few ophthalmologists (for the rank and file of the profession was, at this time, wholly indifferent to the *pros* and *cons* of optometry legislation). The bill was defeated in Missouri, Texas, Illinois, Colorado, Connecticut and Pennsylvania, but passed in New York, Vermont, West Virginia, North Carolina, Delaware, Maine, Washington, Iowa, Rhode Island, Kansas, Michigan and Florida. In 1910, optometry bills were defeated in New Jersey, Maryland, Kentucky, Ohio and Massachusetts. The failure of the bills in that year afforded some ground for the belief, either that the movement had spent its force or that medical opposition would in the future keep these measures off the statute books. However, in 1911, the optometrists 'came back' and succeeded in getting their bills

passed in two more states—Oklahoma and New Hampshire. In June, 1912, the optometrists gained their most notable victory by securing the enactment of their law in Massachusetts.

Practical Operation of Optometry Laws.—Whenever a state passed an optometry law, the optometrists immediately began to place themselves before the public in a manner calculated to lead people into the belief that they were professional men of a superior order both to opticians and oculists. Often they assumed professional titles in which the word 'doctor' was conspicuous, and opened 'offices' for the practice of their 'profession'; in a word, did all in their power to make it appear that they were highly competent to test eyes for glasses. Some of them, indeed, did not stop at fitting glasses without the aid of drugs, but ventured to treat diseases of the eye (witness prescriptions for 'drops' for conjunctivitis, etc., appearing in optical journals). The more bold even ventured to predict that the time would come when they would succeed in invading the realms of ophthalmic surgery.

On the credit side of optometry must be recorded the fact, which the writer thinks is undoubted, that in the long run (not immediately because of the exemption clause) this law has a tendency to drive from the state a great many traveling venders—ten-cent spectacle peddlers, and others of that ilk, who could not pass the more or less rigid tests of the Board of Examiners.

Is it any wonder, then, that the medical profession, witnessing these palpable encroachments upon the field of medical practice, began to 'sit up and take notice?' To Drs. J. C. Bossidy, of Boston, and James Thorington, of Philadelphia, should be accorded the honor of being the pioneer and most effective workers for the medical profession in its fight against optometry legislation. The first thing that was done by these physicians was to enlighten the profession as to the assumption, by optometrists, of professional titles and their seeking to encroach on the general field of ophthalmology in addition to the special field of refraction. This information was greatly needed by those physicians who had been easily led into signing petitions in favor of optometry bills on the plea that the proposed law was a movement to safeguard the eye-sight of the people. When the American Medical Association appointed a Committee on Optometry, of which Dr. Bossidy was made Chairman, the question became of national medical interest. This Committee prepared an extended statement on optometry which was distributed as a Bulletin of the American Medical Association. Dr. Bossidy's committee adopted as its slogan "no compromise and no recognition," and, as already stated, succeeded, with the aid of the local profession, in defeating all attempts of this sort in the year 1910. In many of the states in which the bill was finally defeated, the fight was an exceedingly bitter one. In Maryland and Ohio, for instance, it passed both Houses of the Legislature, and was only defeated by Governors' vetoes at the personal solicitation of eminent members of our profession.

In 1911, as stated before, anti-optometry efforts emanating from the American Medical Association, coupled with rather feeble local medical opposition, were unable to stem the tide in Oklahoma and New Hampshire which passed the typical bill. When in June, 1912, the state of Massachusetts placed an optometry law upon its statute books, the optometrists celebrated the event as their most notable victory. This state, with its strong medical leanings and university influences, was justly regarded as the hotbed of opposition to optometry. The bill was bitterly fought by the medical profession during every step of its progress through the legislature.

Conditions in states which have no optometry laws are inconceivably bad; and offer no support to the arguments of those who still oppose any and every form of regulation. Consider Missouri, for instance—every jewelry store of any pretensions has its 'Doctor' who tests eyes and offers sage medical (?) advice. The same is true of department stores. The word 'Doctor' is used by some retail optical firms as a part of the firm name—'Dr. — Optical Company.' The 'Doctor — Spectacle Company' does a flourishing mail order business. This concern sends to each prospective customer a little chart of test letters, and the eyes are 'fitted' on the basis of the answers received. Any Tom, Dick or Harry can supply himself with a trial case, test cards, etc., and armed with the title 'Doctor' plucked out of the air, roams at will from town to town, testing the sight of all who seek his 'professional' (?) services. The 'Optical Department' in the ten-cent stores does a flourishing business.

Arguments Used by Optometrists.—These are principally the following: First, that optometry has no connection with medicine; second, that optometrists do not use 'drops' in their work; third, that they are learned in the science of optics of which physicians are ignorant; fourth, that they refer cases of disease of eyes to oculists; fifth, that the passage of such a law will protect the public from the dishonest traveling vender of eye-glasses. The answers of the medical profession to these arguments are, first, that a medical training is absolutely necessary for a proper examination of the eye on account of the intimate relation between that organ and other parts of the body. Second, medical authorities assert that, always in children and usually in adults, the use of a mydriatic is necessary to the proper examination of the eye. Third, to have an expert knowledge of optics requires a liberal education, and it is safe to assume that a greater proportion of physicians than opticians has secured a training in physics. Fourth, to refer cases of diseased eyes to oculists indicates an ability to make a diagnosis, which is the most difficult part of medical practice. Fifth, that the passage of an optometry law fails entirely in what should be its object—namely, the safeguarding the health of the people.

The educated physician will readily appreciate the force of these arguments, and his co-operation in the fight against optometry legislation

is easily secured; but how is it when these same arguments are presented before a legislative committee? Too often they fall upon deaf ears, or at least upon ears that are not trained to appreciate the professional point of view.

Let us try to look at this matter from the legislator's standpoint. He knows that as long as there have been spectacles, opticians, who tested the eyes, have existed. He may have purchased his own glasses from such an individual. He knows that some opticians are more successful than others, and naturally infers that the training and ability of some are superior to the training and ability of others. He probably knows of some person who has failed as a tradesman and who, after a few weeks' course in an optical school, has appeared again in a community as an 'eye-tester.' Is it not then perfectly natural that he should listen with favor to the pleas of the optometrist that the law asked for is based upon the fundamental principle of compulsory education, that it will force out of the state opticians incompetent to fit and prescribe glasses, that "those who adapt glasses to the eyes should prove their fitness to do this work intelligently and legitimately"?

The eye being an integral part of the organism is, of course, properly a subject for medical management in case it is diseased. Many eyes that suffer from eye-strain are, to say the least, in an unhealthy condition and should properly come under the care of a physician, more particularly one specializing in diseases of the eye. It must be confessed that such an ideal condition is practically unattainable at the present time, and will probably never be attainable at any time in the future. The present paucity of oculists, in relation to the number of individuals requiring glasses, indicates very definitely that the glassing of the people cannot come exclusively through ophthalmic specialists.

The late Dr. Leartus Connor sought to interest general practitioners in what he called 'simple refraction,' for the purpose of having a large group of men engaged in general practice take over the patients who now naturally drift into the hands of the optometrist. This movement, which gained a certain impetus during Dr. Connor's lifetime, received only half-hearted response from the oculists, who realized that the art of refraction is a difficult one, only acquired after long practical experience, and hence not to be 'picked up' by general practitioners in their comparatively few hours of leisure. They felt sure that the refraction of such general practitioners must necessarily be mediocre, and would be more likely to bring the profession at large into disrepute than to prove an effective method of doing away with the refracting optician. The latter, encountering, say, twenty-five individuals in a single day, all of whom are put through some form of test, must necessarily acquire a certain amount of skill; a vastly greater amount, indeed, than can possibly be acquired by the general practitioner who may see twenty-five refractive cases in the course of six months.

For a number of years many thoughtful ophthalmologists, viewing with distress the enactment of objectionable optometry laws in an ever-increasing number of states, began to question the wisdom of an uncompromising, unrelenting opposition on the part of the profession. They argued that while the results of this policy might be the defeat of a pending bill, it only meant that a similar bill would be proposed at the next session of the legislature, and the fight along the same lines would have to be made all over again. It has been no uncommon thing, since medical opposition began, to see a bill proposed at one, two, three or more sessions of the legislature, at each succeeding session showing more and more vitality, and finally be enacted into law.

The practice of spectacle fitting by opticians and optometrists has become firmly established, and is universally recognized as a legitimate business by all classes of the community (with the exception of that small part of the medical profession which has interested itself in opposing optometry legislation). With public sentiment everywhere favorably disposed, the idea of legislating this business out of existence is the wildest of impossible dreams. And since it cannot be legislated out of existence, it ought to be regulated and controlled by the state. *And right here is where the medical profession has failed to grasp a golden opportunity to do constructive work toward safeguarding the eye-sight of the people—not by relentlessly opposing any and all optometry legislation, but by insisting on the addition to each and every bill of such clauses as will eliminate all but well-trained and well-equipped optometrists, and of such clauses as the 'Jackson clause' (p. 51), or Section 10 of the proposed Missouri law, which specifically denies to non-medical refractionists the right to assume professional titles. If an individual procures his glasses from an optometrist, knowing that he is consulting a mere 'measurer of the eyes' and not a professional man, there can be no question as to the ethics of the transaction. But if a professional title is used to lure a customer, who buys his glasses from a 'doctor' under the impression that he is securing professional (medical) advice, then the transaction is a pure fraud.*

Ophthalmologists know that the individual who is 'glasses' by a non-medical man runs a very definite risk of having some pathological condition of his eyes overlooked. But what have the ophthalmologists done toward educating the public to these facts? To be sure, there have been ophthalmic thunderers who have addressed reverberating words of advice and warning to the balance of the profession; but to the public, little or nothing. Until ophthalmologists awake to a realizing sense of their social responsibilities as educators of the people in the matter of medical attention to eyes needing glasses, the people will continue to entrust their most precious organs to non-medical refractionists.

Not all evil conditions will be eliminated by any form of regulation. There will always remain a few individuals who will insist on 'fitting

themselves' by selecting from the druggist's or peddler's assortment a 'pair of specs' which 'magnify the print.' They can see no essential difference between fitting glasses to the eyes and fitting shoes to the feet. Take away from them this privilege, and hearken to the wail of 'interference with personal liberty'! But, after all, this class is small as compared with the class that has grown accustomed to securing its glasses from opticians. Those who comprise the latter group are, for the most part, of average intelligence, and some, indeed, are highly cultivated. If they had anything the matter with their digestive apparatus, they would not think of dosing themselves, but would send for a doctor at once. They have, too, a subconscious feeling that, for ailing eyes, a 'doctor' should be consulted. The unscrupulous optician has shrewdly diagnosed this subconscious feeling, knowing that if he styles himself 'doctor,' not one in a hundred of this more intelligent class will differentiate between him and the licensed physician who practises ophthalmology. Every ophthalmologist can recall instances of ministers, lawyers, university professors, and successful business men who have fallen easy victims to the lure of the 'doctor' part of the optician's sign.

If optometry laws in their objectionable form, that is in the form which gives to medical practitioners no adequate protection from the pseudo-doctors who treat, as well as refract eyes, are going to be finally enacted in spite of the most bitter medical opposition, what should be the proper policy for the medical profession to pursue?

In 1911, came a most illuminating suggestion in regard to the proper attitude for physicians in connection with optometry legislation. This suggestion originated with one, who, judged from his service to the general medical profession, to the ophthalmologists of the country, to the cause of medical education, and, especially, to ophthalmological education, may justly be regarded as the foremost ophthalmologist in the United States. Reference is made to Dr. Edward Jackson, ex-president of the American Academy of Medicine, ex-chairman of the Section on Ophthalmology of the American Medical Association, ex-president of the American Ophthalmological Society, and an honorary member of the St. Louis Medical Society. In a paper read before the Section on Ophthalmology of the American Medical Association, June 28th, 1911, Dr. Jackson discussed "The Optometry Question and the Larger Issue Behind It." Under the caption "What is to be Done?" referring to the attitude of the medical profession toward optometry bills, he has this to say:—

"In view of the fact that optometry is a part of medical science and art that will not and cannot be dissociated from the diagnosis and treatment of non-refractive defects and diseases of the eye; in view of the fact that it is very important that those who practise ophthalmology should be trained in general medicine, and should continue within the medical profession in close association with those who practise other branches of the healing art; *what should be done with regard to the present agitation for the recognition of optometry as a separate profession?*

"The attempt to ignore that agitation is folly, but mere opposition, the determination to 'stand pat' is almost equally fatuous. If the optometrists are able to convince the public and the legislatures that laws are needed to protect the eyes of the people from the doings of optical fakers, mere opposition to any and every law on the subject places the medical profession in a false and indefensible position. If something is proposed as a measure to protect the public health, it is not for those who claim the right to advise on all such matters merely to oppose, while themselves suggesting nothing. *It is more consistent, more public-spirited, and more effective, to endeavor to modify legislation so as to make it supplement and support the laws now enforced with reference to medical practice.*

"Every optometry law hereafter enacted or amended should be made to draw a sharp distinction between the license to fit glasses and the license to practise medicine. In limiting the operations of optical fakers, it must not overlook those fakers who desire to use the word 'doctor' for the purpose of confusing the public as to the training and fitness of the man who has studied only 'physics' and not 'physic.' The simple insertion of a clause like the following, taken from the bill before the last session of the Colorado legislature, would rob optometry laws of most of their power for evil:—

'Nothing in this act shall be construed to apply to persons licensed to practise medicine in this state, or to give any person the right to attach the title M. D., surgeon, doctor, physician, oculist, ophthalmologist, eye-specialist, doctor of refraction, doctor of ophthalmology, doctor of optometry, or any word or abbreviation to his name indicating that he is engaged in the treatment or diagnosis of, defects, or injuries of the human eye, or to use drugs or medicine in any form for the treatment or examination of the human eye, or to use any therapeutic measures or agencies other than glasses for the treatment of the human eye.'

"No doubt such a clause would diminish the attractiveness of a license for 'optometry'; and in the end might prevent the development of that pseudo-profession of which some optometrists dream. *It would strictly confine the advantages of the license to the comparatively few intelligent, well-trained opticians, who wish only to work at the measurement of refractive errors and the fitting of glasses. The existence of such a class will never seriously endanger the public health, or interfere with the normal development of ophthalmology as a medical specialty.*" [Italics inserted.]

The position taken by Dr. Jackson was supported by another oculist of international reputation; a man who, more than any other in this country, has had the welfare of the people's eye-sight at heart—Dr. F. Park Lewis, Chairman of the Committee on the Prevention of Blindness of the American Medical Association. He said:—

"We might just as well face things as they are. *We are never going to get rid of optometry, existing as it does, by simply opposing it.* I think if we were to get together the record of the bad work of the untrained doctors, it would at least very nearly equal that coming from the optometrists. *I believe Dr. Jackson has struck the root of the matter.* The legislators assume that we have personal reasons for our opposition, and until we can raise our own standards—limit the practice of ophthalmology to those who are trained in ophthalmology—by the adoption of a degree, or some estimate by which there can be assurance that ophthalmologists are qualified, we are going to have optometrists, and they are going to be recognized by the states. I do not believe there is any other way but by establishing a differential degree that will give us control of *the most important part of ophthalmology—refraction.*" [Italics inserted.]

Dr. Jackson and other oculists of Denver succeeded in getting the aforementioned clause into the optometry bill proposed in Colorado. The optometrists were completely taken aback, and determined that rather than see a measure containing this clause pass, they would work to accomplish the defeat of the entire bill. These interesting facts were well brought out by Dr. Jackson in the concluding remarks of his discussion:—

"When it was announced in the papers that the compromise optometry bill had been introduced into the Colorado legislature, some of the men here very quickly had letters from Dr. Thorington, Dr. Bossidy, and others in the East, asking about this compromise bill, and we replied to them and gave them our view of it. It was taken up by the optical journals all over the country. The opticians in Colorado had formed a national optical society, and from that body a committee was appointed to stop that bill. They did stop the bill. It was introduced as their bill at their request by Dr. Sharpley, Health Officer of Denver. This is why they stopped it:—

'Nothing in this act shall be construed to apply to persons licensed to practise medicine in this state, or to give any person the right to attach the title M. D., surgeon, doctor, physician, oculist, ophthalmologist, eye-specialist, doctor of refraction, doctor of ophthalmology, doctor of optometry, or any word or abbreviation to his name indicating that he is engaged in the treatment or diagnosis of diseases of, defects, or injuries of the human eye, or to use drugs or medicine in any form for the treatment or examination of the human eye, or to use any therapeutic measures or agencies other than glasses for the treatment of the human eye.'

"That is what stopped that bill. The optometrists pulled it off very quickly, and if such a clause was introduced into every bill, or such an amendment was insisted upon by every ophthalmologist to be put into every bill or into existing optometry bills, a clause which is perfectly legitimate, entirely in the interests of honesty, not against the opticians or the optometrists, but in the interests of simple honesty, making it apply to those to whom it should apply, then not an optometry bill in the country would do a bit of harm." [Italics inserted.]

History of Attempts to Secure Optometry Legislation in Missouri.—To the best of my knowledge the first optometry bill was introduced in the Assembly, 1907. This measure attracted very little attention. It received only half-hearted support from the opticians and, slumbering peacefully in Committee, finally died a natural death. In 1909 those interested in optometry legislation again drafted the usual bill. Oculists of St. Louis and Kansas City, together with officials of the State Board of Health and representatives of the Missouri State Medical Association, appeared at the legislative hearing and secured an adverse report on the bill. In 1911, a bill similar in scope was again drafted. The Ophthalmic Section of the St. Louis Medical Society appointed a Committee on Optometry Legislation, which issued a statement on "Optometry and Optometry Legislation" that appeared in the *Journal of the Missouri State Medical Association*. A number of county societies passed resolutions condemnatory of the measure. The aforementioned Committee, with representatives from the oculists of Kansas City, appeared at the legis-

lative hearing at Jefferson City, and again secured an adverse report on the bill.

In May, of this year, the legislative committee of the St. Louis Association of Optometrists prepared a bill which, early in August, was submitted to a conference of three officials of the Missouri State Medical Association (the President, Secretary, and Chairman of the Medical Section), the former Chairman of the Committee on Optometry Legislation of the St. Louis Medical Society, and the Chairman of the Optometrists' Committee. At this conference a number of important changes were suggested, which were incorporated in the draft, and the 'Jackson clause,' slightly modified, was included. This amended draft, with one or two changes relating to the method of filing certificates and the fees to be charged for examination (changes which had no bearing on the essential features of the bill), was approved on August 9th by the Missouri Association of Optometrists.

It appeared, then, that Missouri had reached a happy solution of the optometry problem—the acceptance by the optometrists of a draft which had been carefully gone over by a group of representative physicians. However, all hopes for a peaceful ending of the controversy were dashed when the Committee on Public Policy and Legislation of the State Medical Association determined to continue the policy of relentless opposition. This official attitude has had so great an influence with a number of County Societies that they have passed resolutions condemnatory of the pending measure.

The history of the professional fight against optometry clearly shows that uncompromising, unrelenting opposition—the opposition that has been carried on under the slogan "no compromise and no recognition," has *not* prevented the passage of *bad* optometry laws. Members of the profession, who continue to advocate this type of opposition, are no doubt actuated by the best motives, but seem not to realize that they are actually playing into the optometrists' hands by blindly fighting a bill which is not only fair to the medical profession, but must prove a check on the uncontrolled 'practice' of spectacle fitting among non-medical men. If the uncompromising policy pursued to-day by the medical profession is going to result—and in the writer's opinion it must inevitably result—in the eventual passage in every state in the Union of *bad* optometry laws, then he declares that it is not in the interest of the medical profession, or of the public, for such a policy to be maintained any longer.

A NEW FORCEPS FOR ADVANCEMENT OPERATIONS.

By JAMES MOORES BALL, M. D., of St. Louis.

Having found that the various types of advancement forceps now on the market are not satisfactory, the writer has designed a new instrument. Its cardinal points are:—

1. The blades are placed at right angles to the handle.
2. The female blade is roughened, while the male blade has teeth.
3. The blades are closed by means of a sliding catch.

Specifications.—The instrument is $3\frac{3}{4}$ in. in length; the blades extend $\frac{7}{16}$ in. from the handle; the male blade bears six teeth (arranged in three sets of two), each one being $\frac{1}{20}$ in. in length.



It seems to the writer that the merits of this instrument, combining, as it does, the good points of several other advancement forceps, will be appreciated by ophthalmic surgeons without argument. With it, an advancement operation, whether simple (muscle only), or total (muscle, capsule of Tenon, and conjunctiva), can be executed quickly and accurately. Its advantages are:—

1. The placing of the blades at right angles to the handle makes for greater accuracy in the suturing of the muscle to the eye-ball.
2. The absence of teeth in the female blade permits the passing of this part of the forceps beneath the tendon, without difficulty and without undue injury; while the rough surface of this blade, added to the presence of teeth in the male blade, prevents the slipping of the muscle and adjacent tissues.
3. The sliding lock can be closed or opened with less effort than obtains in case the spring catch is used, and it also prevents the accidental releasing of the muscle.

MEDICAL AND SURGICAL PROGRESS.

ETIOLOGY AND DIAGNOSIS OF SCARLET FEVER.

A REVIEW OF RECENT LITERATURE.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Schleissner: The Streptococcus in Scarlet Fever, (*Zeitschr. fuer Kinderheilk.*, Vol. III, p. 28, 1911.)
2. Bernhardt: Experimental Research on the Etiology of Scarlet Fever. (*Deutsch. med. Wochenschr.*, April 27th, 1911.)
3. Park: The Agents Causing Measles and Scarlet Fever. (*Archives of Pediatrics*, June, 1912.)
4. Kolmer: Streptococcic Antibodies in Scarlet Fever. (*Journ. Amer. Med. Assoc.*, December 9th, 1911.)
5. Döehle: Inclusion Bodies in Scarlet Fever. (*Zentralbl. fuer Bakt.*, November 23rd, 1911.)
6. Kretschmer (*Berl. klin. Wochenschr.*, March 11th, 1912.)
7. Nicoll and Williams: Inclusion Bodies in the Blood of Scarlet Fever. (*Archives of Pediatrics*, May, 1912.)
8. Nicoll: Inclusion Bodies in Scarlet Fever Blood as a Means of Differential Diagnosis. (*Archives of Pediatrics*, June, 1912.)
9. Michael: Rumpel-Leede Phenomenon of Scarlet Fever. (*Archives of Pediatrics*, April, 1912.)
10. Miller: The Diagnosis of Atypical Scarlet Fever. (*Archives of Pediatrics*, April, 1912.)

Etiology.—Schleissner has made a careful study of the relation of streptococcus to scarlet fever. In 60 of 108 cases of scarlet fever (55 per cent.) the streptococcus was found in the blood culture. He found no direct relation between a positive streptococcal blood culture and the prognosis; indeed, 31 per cent. of the children showing the streptococcus and 35 per cent. of those without it, had complications. Careful studies along biological lines—agglutinations, complement fixations, etc., have convinced Schleissner that the streptococcus plays more than a secondary rôle in scarlet fever. Examination of the scales of the underlying skin did not show the presence of streptococci. Finally Schleissner concluded that the presence of streptococci does not affect the temperature curve.

Of late there has been a good deal of animal experimentation in relation to scarlet fever, and in consequence some definite facts have been determined which may lead later to important results.

Bernhardt reports some work in the transmission of scarlet fever to monkeys. Proceeding from the premise that the virus of scarlet fever has a special affinity for epithelial tissue, he removed the coating from

the tongue of a child in the early stages of the disease, before the appearance of the so-called strawberry tongue. The scrapings were mixed with normal salt solution and shaken for an hour. Four cubic centimetres of the emulsion were injected into the groin of a monkey, and a quantity was soaked into the mucous membrane of the mouth, tongue and tonsils. After a few days there was a rise of temperature and swelling of the inguinal lymph-nodes. On the fifth day the animal showed well-marked symptoms similar to those seen in man—namely, an erythematous eruption, fever, swollen lymph-nodes, and scarlatinal tongue. The swollen lymph-nodes were removed, treated in the same manner as the coating from the tongue, and then the emulsion was injected into another monkey. In this manner, Bernhardt was able to transmit the disease through three different monkeys, but the fourth showed no reaction. In some of the lymph-nodes, streptococci were found; in some, they were absent. But the presence or absence of streptococci did not affect the experiment. The material injected was sterile in cultures and produced no disturbance when injected into mice. Control inoculations with streptococci produced no results. Bernhardt believes that there is a virus present in the coating of the tongue, in the lymph-vessels of the skin, and in the lymph-nodes. This virus he has proved to be filterable. It produces in monkeys certain symptoms identical with those of scarlet fever in man.

Landsteiner and Levaditi, working along these same lines, transmitted a chain of scarlet fever symptoms in a young ourang-outang. With the lower forms of monkeys used by Bernhardt they were not successful. The young ourang-outang was injected with 10 c.cm. of the non-defibrinated blood of a child suffering with scarlet fever. At the same time the animal's throat was swabbed with the exudate from the child's tonsils. Within four days there developed reddening of the tongue and throat. Two days later the temperature rose to 103° F., and a slight erythema appeared on the animal's chest and abdomen, which disappeared in two days. Nineteen days after inoculation, desquamation began, occurring in the typical manner. Albuminuria also occurred.

The experience of these observers is verified by Park, who failed in six attempts to inoculate monkeys of the lower order. Park is unwilling to ascribe a rôle of any importance to the streptococcus as the primal agent of scarlet fever. He does not feel that Mallory's protozoön bodies can be seriously considered now. Park reiterates the statement, also found elsewhere, that all recent experimental work tends to show that the streptococcus is a secondary invader in scarlet fever.

The studies of Kolmer with reference to the antibodies produced by a number of different strains of streptococcus in scarlet fever have been very exhaustive. The streptococci found in scarlet fever patients could not be differentiated by morphological or cultural characteristics from the streptococci usually found in the throat or in septic conditions. While complement fixation tests had shown a specific antibody for scarlet fever streptococci, this was done only in high dilutions of serum. The same specific relation was readily demonstrated between streptococci causing septicemia and streptococci causing scarlatinal sore throat, etc., and their immune sera. Hence if a claim was made for a specific scarlatinal streptococcus, a similar claim might be made for every streptococcus infection, which is out of the question. Kolmer believes that the streptococcus may, perhaps, be somewhat modified during the course of the infection of scarlet fever, but that is all. His studies have also convinced him

that the Russian school has gone too far in its claims for the efficacy of streptococcus immunization as a prophylactic measure against scarlet fever.

From the standpoint of early diagnosis, and possibly having some etiological bearings, the recent findings of so-called inclusion bodies in scarlet fever are of great interest. They were originally described by Dœhle. In 30 cases of scarlet-fever blood he found certain inclusion bodies in the polymorphonuclear leucocytes. By special staining methods they could be differentiated from the nuclear substance. They were not found after the sixth day. This observation of Dœhle's has been confirmed by Kretschmer. There is no relation between this phenomenon and later developments, for it does not reappear with relapses and complications. Neither is there any claim for absolute specificity. In 70 control cases of the most heterogenous variety (all non-scarlatinal), inclusions were found in 4 cases (6 per cent.). There is thus a presumption that the inclusion body has to do with the streptococcus, and this is borne out by the positive findings. On the other hand, Kretschmer found the inclusion bodies in all cases of scarlet fever which he studied, and was even able by this test to recognize the disease on an exposed child during the incubation period.

Nicoll and Williams report the results of their studies of the phenomenon. They believe that by means of this test (and detailed description of the methods of staining are given) that a blood examination in the first week of the disease will serve to differentiate scarlet fever from measles, German measles, and, probably, toxic eruptions.

Whether a similar differentiation may be made in the case of rashes due to sepsis, influenza, and tonsillitis can only be determined by future study. The authors are unwilling to express an opinion as to the nature of the bodies.

In a subsequent communication Nicoll reports a larger series of cases. This paper is well illustrated. Contrary to the observations of Kretschmer, Nicoll now finds that a prolongation of the fever and symptoms beyond the usual time is apt to result in a longer duration of the bodies in the blood. In 115 cases of scarlet fever reported, all but 16 showed the inclusion bodies, many of the latter having the specimens taken after the seventh day. So far as controls are concerned, the bodies were not found in normal blood. One case of syphilis with streptococcic throat showed them, and 8 cases of erysipelas all showed inclusion bodies. Three cases of diphtheria were negative. So were cases of varicella, pertussis, tuberculous pharyngitis, 23 cases of measles, 17 of German measles, 12 antitoxin rashes. Four cases of typhus fever were positive. Nicoll believes that the test will be of great value from the standpoint of differential diagnosis. It would seem probable that the inclusion bodies may be expected to be present in the majority of pathological conditions in which pyogenic organisms have produced an active leucocytosis. And in the blood examination of suspected scarlet fever cases, the test affords a valuable method of differential diagnosis between this disease and nearly all the conditions which resemble it.

In 1909 Rumpel called attention to the fact that in scarlet fever, hemorrhages could be produced in the skin at the elbow by the application of a Bier stasis bandage on the arm. He felt that this phenomenon could be of diagnostic value in cases of scarlet fever without exanthem.

At Rumpel's suggestion Leede made a systematic study of the phenomenon. As a result of his studies, Leede concluded that a negative

result is positive evidence against the presence of scarlet fever, while a positive one is not in itself conclusive. Benneke obtained similar results.

Mayr examined 100 patients in whom scarlet fever was absolutely excluded, and obtained a positive result in 20 cases. Dr. May Michael has now undertaken a further series of tests. She found that hemorrhage can be produced in practically all normal children by applying sufficient pressure round the arm, and, therefore, holds (in common with several other authors) that a positive Rumpel-Leede phenomenon cannot be regarded as a diagnostic sign of scarlet fever.

Miller calls attention to the difficulty of diagnosis of atypical scarlet fever. No single symptom can be depended upon. The disease may occur without rash, desquamation, fever or strawberry tongue. The most constant symptom is the angina. Its presence with a scarlatinal eruption, however slight, should always demand close observation. Next to the throat, the tongue offers the most valuable evidence, some enlargement of the papillæ of the tip and border being usually observable. Of all the exanthemata, scarlet fever is the most varied in its manifestations; therefore, no rash in a child may be disregarded. The diagnosis of German measles should only be accepted on the strongest evidence. The history of a previous attack of scarlet fever should not prevent us from treating with suspicion apparently anomalous cases. All doubtful erythemata and all cases in any way resembling scarlet fever should be quarantined until the diagnosis is reasonably established.

THE EARLY DIAGNOSIS OF GRAVES' DISEASE.

A REVIEW OF RECENT LITERATURE.

By ALBERT E. TAUSSIG, M. D., of the Editorial Staff.

1. Breitner: Nature of Goitre. (*Mitteil. aus den Grenzgeb. der Med. und Chir.*, Vol. 24, No. 3, 1912.)
2. Coenen: Basedow's Disease. (*Berl. klin. Wochenschr.*, No. 51, 1911.)
3. Klose, Lampe and Liesegang: Basedow's Disease. (*Beitr. zur klin. Chir.*, No. 3, 1912.)
4. Kocher: Functional Diagnosis of Thyroid Disease. (*Ergebnisse der Chir. und Orthop.*, Vol. III, 1911.)
5. Kocher: Goitre and Its Treatment. (*Deutsch. med. Wochenschr.*, Nos. 27 and 28, 1912.)
6. Lampe: Blood Changes in Basedow's Disease. (*Deutsch. med. Wochenschr.*, No. 24, 1912.)
7. Riedel: Early Operation in Basedow's Disease. (*Muench. med. Wochenschr.*, No. 28, 1912.)
8. Wolfsohn: Thyreosis and Anaphylaxis. (*Deutsch. med. Wochenschr.*, No. 30, 1912.)

Patients with Graves' disease usually do not come to operation until their condition has become serious. In the beginning of the disease its nature is usually not recognized. Later, they are treated with one drug after another, often by a number of physicians in succession, and it is only after all medication has proved unavailing and the patient's strength and vitality are at a low ebb that they are referred to the surgeon as a last resort.

The operation then becomes a very serious one, though, even so, fatalities are rare in skillful hands. After operation, the first symptom to disappear is the restlessness. Later the tremor subsides, the patient's psychic condition improves, and, after the lapse of weeks or months, the heart becomes quiet. The last symptom to disappear is the exophthalmos, and, indeed, this may never quite vanish; so that, in the eyes of the world, the operation has been unsuccessful even though the patient be subjectively well. The patients usually gain rapidly in weight but much more slowly in strength; severe cases often require a full year for a complete restoration of strength.

The results are, however, quite different if the operation has been done early in the disease. The complete restoration of function may then only be a matter of days, and the lapse of a few weeks after operation sees the patients normal in every way. To obtain such results, two circumstances must conspire: an early diagnosis, on the part of the physician, and sufficient resolution, on the part of the patient, to impel him to consent to operation at a stage of the disease when he may not consider himself seriously ill.

Nothing is easier than to diagnose Graves' disease, in its advanced stages, with exophthalmos, goitre, tachycardia and tremor. But in its beginning, any or most of these signs may fail us. How many cases, with early hyperthyroidism, complaining of irritability, nervousness, insomnia, exhaustion and cardiac palpitation on slight exertion are thought to be suffering from neurasthenia or heart disease and dosed with all sorts of nervines and tonics, bromides, digitalis, strophanthus, or even cactus! None of these drugs can avail, since they cannot influence the constant flooding of the body with toxic thyroid secretion. Even in these early stages, however, a positive diagnosis is possible by means of a combination of careful clinical observation and laboratory examination, especially of the blood.

Ocular Signs.—A true exophthalmos, when present, can hardly be overlooked. Unfortunately it is usually a late manifestation and may be absent during the entire course of the disease. A phenomenon, that often occurs much earlier, is Dalrymple's sign. This consists in a permanent retraction of the upper lid, so that the latter appears very narrow, being hidden under the suprapalpebral prominence. When the patient is made to look fixedly at an object straight in front of him, a thin line of white sclera may be seen between the upper lids and the pupils. This gives the eye the staring look characteristic of the disease, and often leads to the assumption that there is an exophthalmos, even though there be actually no protrusion of the bulbi.

Other early signs are the peculiarly shining appearance of the eyes, first described by Krause, and the momentary spasm of the levator palpebræ superioris that occurs when an object at which the patient is gazing fixedly is moved quickly upwards. The well-known sign of Græfe, consisting of an inability of the upper lids to follow the eye-balls as they rotate downwards, is usually of later occurrence, and the same may be said of Stellwag's sign, consisting of abnormally infrequent winking of the lids, and that of Mœbius, which designates an inability of the eyes to converge upon an object held near the face.

Tremor.—Next to these lid symptoms, one of the most important indications of hyperthyroidism is the tremor. If the hand is held out horizontally, with the fingers spread, a tremor may usually be observed characterized by fineness and uniformity. An important characteristic of this tremor of hyperthyroidism is the fact that even when the patient makes an effort to hold the hand steadily, the tremor retains its qualities of fineness and equableness. Tremors due to nervousness, hysteria, or tetany usually become coarser and more irregular when the patient tries to suppress them.

Kocher has called attention to the observation that a similar tremor may be observed in hyperthyroidism when the patient holds his leg raised in the air, as he lies in bed. He has seen cases in which the tremor of the hands was nearly or quite absent while that of the legs was well marked. He ascribes this to the fact that raising the leg, while in the recumbent posture, involves much more of an effort than extending the arm. There are patients who describe, as one of the earliest manifestations of the disease, a tremulousness and weakness in the legs.

This tremor often involves also the eye-lids and the tongue. It is an expression of the extreme irritability of the nervous system characteristic of the disease and manifesting itself in hasty movements, rapid speech, restlessness, blushing, poor sleep, and a tendency to diarrhea. It is obviously due to thyroid intoxication, for the same phenomena may be

observed in administering thyroid preparations to a myxedematous patient as soon as the dose becomes a little too large:

Heart.—Palpitation and tachycardia have always been considered cardinal symptoms of the disease. But it is by no means just to base the diagnosis of hyperthyroidism alone or chiefly upon a rapid pulse. The causes of tachycardia are many, and in utilizing this symptom frequent false diagnoses are made. A rapid heart's action can be utilized for the diagnosis of a beginning hyperthyroidism only by combining the examination of the heart with that of the circulatory system as a whole. In the early stages of the disease the vasomotor instability is very marked. The slightest excitement causes the patients to blush, their hands become hot, they break out into profuse perspiration; often the tissues about the eye-lids are reddened, and a hyperemic prominence appears above the upper lid. If besides these vasomotor changes there is a pulse-rate of 120 to 140 or more, without its being possible to find, on examining the heart, any sufficient explanation for this tachycardia, then there is reason strongly to suspect the presence of a condition of hyperthyroidism.

Not infrequently the presence of a murmur in the cardiac region may lead to the assumption of a valvular lesion. The murmurs found in a thyroid heart are most frequently localized over the pulmonic or tricuspid regions, but may occur at the apex or over the aortic area and then closely simulate mitral or aortic disease. The absence of a corresponding cardiac enlargement and of the other signs of valvular defect should ensure the proper interpretation of these murmurs. Their nature and the mode of their production are quite unknown.

Goitre.—The sign upon which most stress is ordinarily laid is the presence of a palpably enlarged thyroid gland, and it is probably true that in every case of Graves' disease, even in its earliest stages, there is some thyroid hyperplasia. This enlargement may, however, be so slight or so situated as readily to escape detection. Cases of this sort have been frequently reported, sometimes under the caption of Graves' disease without enlarged thyroid. Riedel reports an interesting case, a patient with tachycardia, tremor and great nervous instability, who had been treated by a number of eminent men as a neurotic. Careful examination showed an apparently normal thyroid, except that when the patient swallowed, a small hard nodule made its appearance above the sternum. A partial thyroidectomy resulted in a prompt disappearance of all symptoms. Even when the thyroid is clearly enlarged, its actual size may be much greater than was suspected. Not infrequently, patients with what appears to be a moderate thyroid enlargement complain of great interference with respiration or deglutition. At operation such thyroids may be shown to be very large, the bulk of the mass being either retrosternal or lying posteriorly so as to be not easily accessible to palpation. This will most readily be the case in fat or muscular patients, or in individuals with very short necks.

The goitre of Graves' disease may be hard or soft, uniformly or asymmetrically enlarged. In the vast majority of cases, however, it is characterized by a uniform enlargement of the entire gland, which is of the same consistency throughout. It can usually be made out at the very beginning of the disease, often long before the patients themselves become conscious of any increase in its size.

If the thyroid, as is often the case, is very vascular, a characteristic murmur may often be heard. This usually takes the form of a sharp, blowing, systolic murmur usually heard best at the upper poles of the

gland, though occasionally it may be made out best over the inferior thyroid artery. These murmurs can sometimes be heard, so Kocher states, before any of the constitutional signs of hyperthyroidism have become well marked. An important indication of a very vascular thyroid is the rapid subsidence of the tumor when the patient is put to bed. This never occurs except in the goitres of Graves' disease.

In the early stages of the affection, it is the rule to find the thyroids distinctly tender to pressure, often very greatly so. This distinguishes them from the ordinary goitres which are never tender. This increased sensitiveness is, however, also found in malignant strumas and also, of course, in inflammatory affections of the thyroid.

Emaciation.—An excess of thyroid secretion leads to a marked increase in the oxidative processes of the organism. Their exact determination requires special laboratory facilities, but in their results they can readily be recognized. The rapid emaciation of these patients corresponds exactly to the known effect of the administration of excessive doses of thyroid gland in the treatment of obesity. Not only does the fat disappear very quickly, but the muscles become flabby and atrophic, the breasts nearly disappear, the hair falls out, the nails become discolored and ragged, and areas of brown pigmentation appear on the skin.

Often this rapid loss of weight may be explained by the digestive disturbance, consisting usually of obstinate vomiting and of frequent and persistent attacks of diarrhea; but even where these disturbances are slight, emaciation may occur, especially if the patient's diet is incorrectly chosen.

The cause of the headache, from which patients with hyperthyroidism often suffer, remains obscure. It may be due to the thyroid toxin itself or to the resulting increase in the products of oxidation. The headache is usually worse in the morning and may be the most striking feature of the disease, as well as one of the earliest ones.

Blood.—Caro was probably the first to call attention to the blood changes in Graves' disease, but their true significance for diagnosis and prognosis has been established by the researches of Kocher. The red corpuscles and the hemoglobin show no characteristic changes, but the reverse is true of the white cells. The latter are altered in two respects. In the first place, the polymorphonuclear neutrophiles are diminished in number, sometimes very greatly so. This diminution reveals itself most clearly in the differential count. Instead of constituting, as in normal blood, some 75 per cent. of the white cells, their percentage falls to 60, 50 or even 35. Often this diminution is an absolute one resulting in a leucopenia. Thus, instead of 7,000 white cells per cubic centimetre, the blood of an advanced case of hyperthyroidism may contain only 2,000 leucocytes. Other observers, among them Lampe and his associates, have failed to find any absolute leucopenia in their cases; but in the constancy of the fall in the percentage of the neutrophile cells there is general agreement. Simultaneously with the fall in the percentage of the neutrophiles, there is a corresponding rise in the percentage of the lymphocytes. Instead of being 25 per cent., as in normal blood, they may form as high as 60 per cent. of all the white cells; ordinarily their rise is, however, only to between 35 and 50 per cent. The difference in the percentages reported by various observers is probably dependent upon the various ways of classifying the large mononuclear cells, some grouping them with the lymphocytes, others with the transitionals. Of the general fact that the relative lymphocytosis characterizes most cases of hyperthyroidism, even in their early stages, there can be no dispute.

The matter is, however, still further complicated by the fact that exactly the same changes are uniformly observed in the case of hypothyroidism; most markedly when there is outspoken myxedema, but to a less extent even in atypical cases. This is by no means an unimportant matter. Cases of enlarged thyroid, with general asthenia, sometimes present themselves in which it remains to be determined whether the thyroid activity is normal, subnormal or abnormal. The differential leucocyte count serves only to exclude the first alternative, but gives no information as to whether the thyroid is inactive or over-active. Fortunately another blood-test serves to distinguish between these two conditions. This is the coagulation-time of the blood. In Graves' disease the blood clots more slowly than normal, in myxedema more rapidly. Kottmann, using his coagulo-viscosimeter, determined the coagulation-time of normal blood as eighteen minutes; that of Graves' disease may rise to as high as twenty-four minutes, while in myxedema the coagulation-time may fall to six minutes. The variations from the normal are ordinarily, however, not so great, especially in early cases. Kottmann's researches seem to show that this difference is dependent upon the increased oxidation characteristic of hyperthyroidism and the diminished oxidation in myxedema. Not only do the abnormally active oxidative processes of hyperthyroidism give rise to waste products that interfere with coagulation, but the fibrinogen and fibrin ferment themselves are in part destroyed, thus resulting in a diminished amount of clot-forming material. The reverse obtains in myxedema. These findings are confirmed by the changes in the freezing-point of hyperthyroid and myxedematous blood as compared with the normal, the one being abnormally low, the other high. This shows that in the blood of Graves' disease there is an excessive amount of small molecular waste-products, while these are scanty in myxedematous blood.

The changes in the blood of patients with Graves' disease, after operation, are also interesting. At first, as after all operations, there is a marked leucocytosis with a relative increase in the neutrophile cells. This is soon replaced by a relative lymphocytosis, often higher than before operation, which may persist for months, even in cases that show prompt clinical improvement. Sooner or later, however, in cases that have been cured, the lymphocytosis subsides and the blood resumes its normal aspect. If the lymphocytosis persists, one of two conditions is probably present. Either not enough thyroid tissue has been removed and the patient is still suffering from hyperthyroidism, or too much has been taken away and he is becoming myxedematous. Which of the two alternatives is the true one can only be determined by estimating the coagulation time.

Functional Test.—A test that is often decisive in obscure cases consists in the cautious administration of thyroid substance, either in the form of dried thyroid gland, or better still as iodothyrim. If small doses rapidly result in the appearance of evident signs of hyperthyroidism (ocular signs, tachycardia, vasomotor instability, tremor, etc.), the diagnosis of latent or early Graves' disease may be considered as established. The dosage must be kept small and the patient carefully watched, not only because large doses may give rise to positive symptoms even when the thyroid is relatively normal, but because, in early Graves' disease, a permanent exacerbation of the condition may result. The test is most useful when, in doubtful cases, the question of operation is to be decided.

Summary.—1. In all cases of Graves' disease, even in the early stages,

there is an increase in the size of the thyroid gland. This may, however, be so slight or so well concealed that it requires a skilled examination for its detection.

2. One of the earliest signs is a tachycardia. This should, however, be considered as evidence of hyperthyroidism only when inexplicable otherwise, and when accompanied by evidence of vasomotor instability.

3. The other signs vary in the frequency of their occurrence, but some of them will always be present. The typical tetrad—goitre, exophthalmos, tachycardia and tremor—is, however, by no means requisite for a positive diagnosis.

4. The blood-changes are often of great diagnostic importance. They consist of a diminished percentage of neutrophile cells, an increased percentage of the lymphocytes, and a diminished coagulability of the blood.

5. Occasionally the diagnosis may be clinched by an increase of the hyperthyroid manifestations, following the administration of minimal doses of thyroid gland.

THE DISCUSSION ON EPILEPSY BEFORE THE SOCIETY OF
GERMAN NEUROLOGISTS, SEPTEMBER, 1912,
HAMBURG.*

By SIDNEY I. SCHWAB, M. D., of the Editorial Staff.

At the recent meeting of the Society of German Neurologists held at Hamburg in September, 1912, the first subject considered was a report on epilepsy.

Redlich opened the discussion with a paper entitled "The Clinical Position of the So-Called Genuine Epilepsy." He says there is at present no consensus of opinion upon the clinical position and the limits of genuine epilepsy. The ordinary divisions of idiopathic, or essential epilepsy, may be considered from etiological, anatomical, or pathological points of view. A genuine epilepsy may be defined as that form of epilepsy which has an unknown, or an unclear etiology, or one which depends upon a congenital tendency of the individual. Naturally, a differentiation must be made between the causes which act favorably for the development of epilepsy and such causes as have a direct influence upon the epileptic attack itself.

In regard to heredity, which has been said to be the most important existing factor in epilepsy, the high percentages which have been obtained in the statistical studies do not stand critical analysis. Important from the hereditary standpoint are the congenital factors and the similar strain in the direct inheritance line. Epilepsy, however, does not belong to the directly inheritable diseases. At most, it is the tendency towards a disposition for epileptic attacks which can be inherited.

A definite cell influence produced through syphilis as a cause for epilepsy is possible, but as far as our knowledge goes to-day, this cannot with certainty be asserted. However, there is a possibility that alcohol in the history of the direct hereditary line can be counted as a cause in a small number of cases. On the other hand, these same destructive factors can produce epileptic attacks in those individuals who are disposed towards the disease, and also can produce epileptic attacks in those individuals who apparently have no particular tendency to the attacks.

Acute infectious diseases can produce epilepsy by means of the development of mild meningo-encephalitic processes.

Of the chronic diseases, syphilis is of the first importance in the production of epilepsy in all its modifications. In a Fournier sense, we cannot to-day admit the possibility of a parasymphilitic epilepsy; that is, a pure, dynamically caused epilepsy, for the reason that in such an epilepsy there is very probably a histological change of the finer sort. This also applies to cases of epilepsy in later stages of syphilis, in which there is no evidence of gross anatomical disease. A certain portion of this class has an interesting relationship with progressive paralysis. A traumatic epilepsy can be brought to light, showing anatomical destruction of the skull or brain. In other words, there probably are to be found fine histological changes in the brain.

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Of the most important of the poisons which come into consideration as causes for epilepsy, alcohol is the first. Alcohol can cause an epilepsy either with or without previous disposition. This form of epilepsy may be made to disappear under conditions of absolute abstinence. There is a real, genuine alcoholic epilepsy, or, in other words, one that can become chronic; this latter is the habitual epilepsy of the drinker. It can be easily seen that no very definite limits can be placed between these two conditions.

Puberty and menstruation have only an indirect causative importance. In this class of cases the possibility of the effect of the secretory products of the glands of reproduction comes into the question.

Gravidity and puerperium have been known to influence in a favorable manner existing epilepsy, but, as a rule, their influence is the contrary.

There are cases in individuals with marked tendency towards this disease in whom epileptic attacks develop, which take on a periodicity closely simulating the menstrual type.

The relation of epilepsy to Basedow's disease and tetany is admitted. This class probably has relationship with the internal, secreting glands. Especially in tetany it is found that epileptic attacks are not infrequent. Both diseases can be combined in various ways. In such cases the pathogenic relationship must be admitted. At any rate, as our knowledge now stands, we are forced to admit that there is some relationship existing between the outbreak of the epileptic attacks and the internal secreting glands.

The rather frequent combination of migraine and epilepsy seems to point to a certain pathogenic similarity in both diseases, depending, perhaps, upon the question of intracranial pressure.

In place of the so-called genuine and symptomatic, as different varieties, there has been an effort made to divide epilepsy into an early developing epilepsy and a late epilepsy. Weber speaks of true epilepsy and identifies it largely with an epilepsy developing early. In cases of late and senile epilepsy, exogenic destructive agencies play a more important part than in the early epilepsy, but here also there are cases without known etiology and with direct hereditary factors. Even so, there is always the possibility of a gross anatomical disease, together with a symptomatic production of the attacks. In cases of senile epilepsy, arteriosclerosis is of the greatest importance. Sometimes there are cases of late epilepsy which seem to be identical clinically and anatomically with the ordinary epilepsy. In regard to division, based upon the clinical phenomena, there are numerous attempts at classification. There has been an effort made to differentiate sharply the genuine epilepsy from the Jacksonian attack, the latter being considered an organic epilepsy; but everything that has been written on this subject cannot be considered as applying generally.

In true epilepsy there are often found partial attacks, particularly in the status epilepticus—in fact, the status hemi-epilepticus has been described.

On the other hand, in cases of organic cerebral disease, both of a stationary and progressive kind, there have been observed instances of universal convulsions. In the latter instances, cysticercosis and tumors of the brain are of particular interest, especially those of the right frontal and temporal lobes, and likewise of the hypophysis. In both cases there has been found frequently such a typical chronic epilepsy that one is justified in the belief that a genuine epilepsy is present.

The paralytic phenomena following attacks are more frequently found

after the typical Jacksonian attacks in cases of anatomically located focal disease than in cases of genuine epilepsy. These are, as a rule, fatigue paralyses. In instances of repeated attacks, or as a part of status epilepticus, they are very noticeable and last frequently a long time. In most cases, however, there is a difference between the skin and tendon reflexes on both sides, or a Babinski phenomenon more definite on one than on the other. These appearances, following attacks, are the result of histological changes of the cortex that tend to increase in proportion with the severity of the attacks.

The fatigue paralyses can become, after a while, fairly permanent symptoms, but they may also appear in cases of epilepsy without gross anatomical changes, and they also can be in such instances unilateral in character. They are to be considered then the result of the summation of the changes which go hand in hand with the attacks. They are the histological measurements of the severity of the attacks.

In other cases, from the very onset, anatomical processes in certain parts of the brain can be deduced. In this way there is furnished a transition process from the genuine epilepsy to the organic epilepsy.

The comparison between the changes found in infantile cerebral paralysis and those found in long-continued epilepsy is important—cysts, localized edema of the arachnoid, and diffuse changes.

Cases of epilepsy with hydrocephalus form the connecting link between an ordinary epilepsy and the organically produced type. Even in cases of genuine epilepsy it is better at present to admit anatomical changes in the cortex. We have, in this regard, the Ammonshorn sclerosis; then there are found frequently meningeal processes, chronic changes of the cortex, and, more important, the Chaslin gliosis. In a word, we have at present, if not the pathological anatomy of epilepsy, at least a pathological anatomy of epilepsy.

An important factor in the delimitation of epilepsy is played by the psychic symptoms. The epileptic change in character and the dementias are important factors in determining the type of epilepsy. They, however, may be wanting in cases of true epilepsy; and in cases of organic epilepsy, especially when they have developed in childhood and lasted for years, they may appear. In regard to these psychical changes, they do not touch directly upon the question of chronic epilepsy; they depend upon indirect causes. They may be considered consequences of toxins, or the result of changes in the brain, of which at present we know very little.

Great interest has been aroused of late in those cases in which apparently genuine epileptic attacks occur as a result of psychical disturbances, and only at infrequent intervals. To this class belong the so-called psychasthenic convulsions of Oppenheim, the affect epileptic attacks of von Bratz; and similar phenomena are found outside these conditions, for example, following orthopedic operations, in cases of appendicular inflammation and abstinence from morphine, in cases of poisoning, and in dementia præcox. There really are individuals in whom only occasional and isolated epileptic attacks occur, but in such cases one must reckon with the fact that later and chronic epilepsy may develop.

In conclusion, it must be said that genuine epilepsy, as generally considered, does not permit classification based either upon etiological or clinical, anatomical or pathological data. It, perhaps, is better to give up the name and concept of genuine epilepsy altogether. At the present time the only form of epilepsy that can be sharply limited is chronic

epilepsy. As an explanation of this difficulty in classification, it is best to assume a certain epileptic reaction characteristic of the brain. This can be increased by congenital factors, lesions of the brain causing likewise an increase of this reaction. The extent of the latter, whether circumscribed or not, is of importance in determining the form of the attack. The etiological factors of epilepsy are effective probably through the changes in the brain itself. Epileptic attacks themselves tend to increase the disposition for further attacks, very likely through the histological changes induced.

The secondary question concerns itself with the pathogenesis of the individual epileptic attacks from the standpoint of the pathogenic factors at work in producing them. This is particularly true of the vascular phenomena on the stimulating and inhibiting threshold of increased pressure of the cerebrospinal fluid and other factors which at present cannot be determined.

Binswanger, in a further report on the clinical position of the so-called genuine epilepsy, elaborated the subject under discussion.

1. The clinical position of the so-called genuine epilepsy can be discussed at the present time only in a very unsatisfactory way.

2. There are two opposing views from which the conception of the idea of epilepsy can be considered. The first point of view has to do exclusively with the effort to advance the anatomical and etiological proof, that the whole subject of epilepsy should be placed in the class of organic brain diseases. The other has to do with the idea that epilepsy is simply a clinical symptomatic expression.

3. Those who support the first theory place in the middle point of their clinical consideration the idea that the epileptic disease process is a chronic and progressive one, and has its expression less in the attacks themselves than in the symptoms of the interval states and in the progressive mental decline.

The following clinical facts are in opposition to this theory: (a) Only a small proportion of cases show a chronic, progressive course with mental defect, the so-called epileptic dementia. (b) In the second group there does take place, without doubt, a mental change, which does not consist, however, in a declining intellectual process, but in a curious psychical and intellectual change in the individual's general character, the so-called epileptic character alteration. These psychopathological phenomena are sometimes stationary, sometimes they show marked variation, and sometimes disappear entirely. They cannot, therefore, be said absolutely to bear any relation to the intraparoxyssmal phenomena. (c) There is without doubt a certain group of epilepsies which have up to this time not received the consideration that they deserve. This group shows, outside the epileptic paroxysms and the so-called equivalent attacks, no psychical abnormality. Belonging to this group are mentally highly developed individuals. The majority of these individuals are active in their particular lines of work, and until advanced age show no diminished mental strength. (d) Therefore, there is a group of non-dementing epileptics in whom we might speak of the possibility of a complete cure of their disease. The personal experience of Binswanger leads to the conclusion that the number of cured epileptics is much greater than is commonly supposed.

4. In consideration of the clinical facts stated above, the epileptic convulsive paroxysms stand in the middle point of the clinical picture of epilepsy.

Therefore, according to this point of view, the diagnosis of epilepsy is only justified in those cases in which at some period in the patient's life true epileptic attacks have been observed. As simple as this conclusion is in the majority of epilepsies with full developed typical or atypical, as well as rudimentary, attacks, in which the convulsive component is present, together with disturbance of consciousness, it is altogether different in borderland cases.

Clinical investigation has before it the task of penetrating deeper into the symptomatology and the progress of epilepsy, and to attempt to differentiate more sharply the epileptic-like attacks, or epileptoid, from those of the true variety. In recent years, this attempt has made very definite progress. The group of psychasthenic convulsions of Oppenheim, the multiplication of small attacks of Heilbronner, the narcolepsy of Friedmann, the affect epilepsy of Bratz do not belong, apparently, for the most part, to epilepsy, even if here and there the clinical differentiation between the two is not very certain.

5. The adherents of the so-called anatomic epilepsy support their views almost exclusively upon the researches of Alzheimer, who has shown that in about 40 per cent. of cases of genuine epilepsy characteristic pathologico-anatomical changes are to be observed. This has been called the gliosis of Alzheimer. It attacks chiefly the most superficial layer of the cortex, especially the glia cells and the layer of small pyramidal cells, and is to be recognized by the fact that the hypergliomatosis seems to be the very definite part of the architecture of the cerebral cortex. Alzheimer himself characterizes this growth of the glia as a secondary and reparative phenomenon, with which the disappearance of functionally-active substance of the cortex is directly connected. The destruction of the cortical substance is bound together with the occurrence of epileptic paroxysms, and is caused anatomically by the production of abnormal cell products derived from the destruction of the nervous elements themselves.

Alzheimer considers, although in direct opposition to many representatives of the anatomic epilepsy, that the tissue destruction and likewise the epileptic dementias are a direct result of the epileptic attacks. In this view, for many years, Binswanger has concurred.

6. According to this view, one is justified in holding fast to the notion of an anatomic-etiological group of organically caused epilepsy, but the cases of real epilepsy, with the consequent Alzheimer gliosis, do not belong to this class. In this group we are permitted to classify the cases in which macroscopically and microscopically a demonstrable disease of the brain can be said to cause the epileptic disease. They are to be particularly considered as inhibitory processes in development, such as diffuse lobar and focal sclerosis, fetal and post-fetal inflammatory degenerative processes, and the acute infectious encephalitic focal diseases. They can all be included in the class of clinical pictures of idiocy, weak-mindedness with epilepsy and cerebral infantile paralysis with epilepsy; but it must be particularly admitted that as a result of an acute infectious encephalitic disease, the epilepsy can be developed without a particle of mental deterioration. The anatomical groundwork of these epilepsies can be determined in a certain proportion of cases by the particular kind of development of the epilepsy (the circumscribed limited initial symptoms preceding the first attack of a true epilepsy), or through definite periodical and post-paroxysmal symptoms (the unilateral variety of Redlich).

In another variety of cases the infectious encephalic disease never makes its appearance during the patient's life.

7. The organic epilepsies can be classified according to some etiological clinical classification—the toxic, traumatic, the chronic infectious and the arteriosclerotic; but in these cases the pathological changes which have some relation with the development of the epilepsy can likewise be demonstrated, and even in the traumatic epilepsy a great many changes that have to do with the trauma itself can come into the question; for example, traumatic necrosis with the formation of cysts.

The conclusion, therefore, seems justified that a sharp division line between the organic epilepsies and the others is at present not possible.

There remains another group then in which the clinical determination of the epilepsy depends upon the basis of hereditary predisposition. It may depend upon an injury to the procreative cells, or some predisposition which has been acquired in the earliest years of childhood. This predisposition may depend upon an endogenous or an exogenous cause. In this constitutional form of epilepsy there are certain factors in relation to the individual development of the epileptic, which have an influence upon the determination of the attacks. In certain cases these factors, probably of an endogenous kind, are absolutely unknown. There is no doubt of the fact that in certain cases of genuine epilepsy there are microscopically demonstrable hyperplastic changes in the brain, which lead to the conclusion that this constitutional form of epilepsy depends upon inhibition of the normal development, due to morphological abnormalities. It is instructive in this respect to note that the Ammonshorn sclerosis found in about 50 per cent. of genuine epilepsies belongs probably to the primary hyperplastic morbid process.

8. After all, there remains a group of epilepsies which have a dark and unclear etiology, and which, for the present at least, must be called the pure dynamic type. It must be admitted that this idea is only worthy of a working hypothesis and depends upon the conception of the so-called epileptic change in the brain, the idea which Nothnagel was the first to promulgate. These disturbances of dynamic equilibrium lead to the epileptic attacks, which in the meaning of Jackson and Gowers must be looked at for the present as an explosive phenomenon due to maximum tension.

9. This dynamic disturbance can be caused by a variety of factors, which go hand in hand with chronic injuries. In this way it can be explained that, in spite of the most widely differing causes, a disease can develop which shows in its progress the most individual differences, but which has running through it the common factor of a periodical disturbance of a more or less similar kind, and for this reason should to-day be regarded as a clinical entity.

Rothmann read an original paper on the origin of epileptic convulsions. This paper is based upon experiments upon the cortex of animals, and has to do with attempts to solve the problem of the relationship of the cortex to epileptic convulsions. There are, evidently, two different conceptions of the origin of epileptic convulsions. One is, that they are purely cortical in origin, and the other assumes that there is a definite convulsive centre subcortically located. Another assumption is that the epileptic attacks can be divided into a cortical and a subcortical division.

Zeichen, supporting his views on experimental evidence, was the first to suggest that in a clonic convulsion the clonic component is purely cortical, whereas the tonic component is purely subcortical in nature. If, during the convulsive attack, the cortex is extirpated, the cortical clonic convulsion ceases immediately, whereas the tonic convulsion remains.

Binswanger determined that in a rabbit there is a reflex centre in the pons, which might be considered as a collecting station of the spinal centres, and which under conditions of pathological increase of stimuli, becomes the centre for convulsions.

The novel part of the author's experiments has to do with the effect of cold upon the cortex. The centre for movement of an extremity was laid bare on a dog, and the dura was opened. An epileptic attack was then produced by means of a strong faradic current, and during this manifestation an ethylchloride spray is directed towards the cortical centre in question. In from three to five seconds the convulsion stopped, which ordinarily, without the spray, would have lasted from thirty to forty seconds. When the dura is again closed, the dog experimented upon shows himself absolutely normal, without a trace of convulsion or irritation phenomena in the extremities.

As a result of these experiments, the conclusion seems obvious that cooling of the cortex is an excellent means of stopping convulsions, because it lowers the stimulation threshold of the cortex, and can be used also through the skin which lies over the place where the fine opening is made.

The question now is, In how far do these conclusions, based upon animal experiments, apply to human beings? It must be admitted that the clonic component of the convulsion is certainly cortical in origin. The experiences of brain surgery in cases of Jacksonian epilepsy show this clearly.

The following conclusions by Rothmann are put down as a result of this investigation:—

First, the investigation of convulsions in dogs with extirpated cerebellum shows that the tonic character of convulsions, limited to the extremities, without the cortical influence, has been done away with, whereas in the same case convulsions in the face region still kept their clonic character.

In convulsions which arise from lesions in the cerebellum, from a stimulation of the cerebellar nuclei, the convulsion on the extremity of the same side consists in a tonic flexor convulsion particularly located in the foreleg. In cases in which the region for the extremity in the brain is extirpated, and at the same time the cerebellar function is thrown out of action, a convulsion of all extremities takes place, with a tonic extensor convulsion of the same.

The cortical convulsive attacks in the dog and in the monkey make use of the same paths as the voluntary movements and those produced by electrical stimulation; that is, in the case of a dog, the cortical spinal and rubrospinal lateral column paths, and in the case of the monkey, in addition, paths of the anterior tract in the spinal cord. In dogs the exclusion of the function of the cerebellum and the destruction of the pyramidal tract do not influence in any important way the path of the cortical convulsive seizures.

By the method of cooling the cortex, it is possible to stop convulsive seizures which have been produced by the electrical current. In human beings the cortical component of the convulsive attacks stands more in the foreground; but, at the same time, tonic cerebellar attacks occur. Likewise in human beings, the cooling of the sensory motor region of the cortex with ice and salt mixtures, or with ethylchloride, is capable of stopping the epileptic clonic convulsions, or, at least, decreasing their intensity in a very definite way. Therefore, the method of cortical cooling might be of some importance in the therapy of the human being.

Fackenheim gave the results of the crotalin treatment of epilepsy. Crotalin is a preparation derived from the salivary gland of the rattlesnake, *crotalus adamanteus*, and consists of two albumin-like substances. One has a hemolytic action, and the other a paralyzing action of the nerves in the human organism.

A great many observations and experiments have shown that the blood of epileptics possesses a greater coagulation power than that of the normal man, and that shortly before the attack the coagulation time is much quicker than after the attack.

The author has shown microscopically that the crotalin destroys the coagulation faculty of the blood. The use of crotalin is by means of subcutaneous, or intramuscular injections of different strengths and at different intervals. These vary according to the severity and the duration of the disease. The treatment lasts a long time and should be very much individualized. All narcotics and bromides must be left aside. The author gives an account of many cases treated by him in this way. A portion of them must be regarded as cured, some are yet under treatment, and some are improved. His conclusion is that crotalin treatment in cases of genuine epilepsy can result in a cure, and works an especially favorable influence on the nervous system and the psychical state of epileptics. Spangler has come to the same conclusion. The latter gave his favorable results the year before.

RECENT SUGGESTIONS IN OCULAR THERAPY.

A REVIEW OF RECENT LITERATURE.

By JOHN GREEN, JR., M. D., of the Editorial Staff.

1. Colombo: Gonococcal Serum in the Treatment of Gonorrheal Conjunctivitis of the Newborn and Its Mode of Action. (*Klin Monatsbl. fuer Augenheilk.*, April, 1912.)
2. Derby and Pratt: The Use of Serum in Sympathetic Ophthalmia. (*Archives of Ophthalmology*, November, 1911.)
3. Gilbert: On the Effect of Venesection, According to Dyes, in Glaucoma. (*v. Græfe's Archiv fuer Ophthalmologie*, November 7th, 1911.)
4. Geibel: The Treatment of Tabetic Optic Atrophy. (*Zeitschr. fuer Augenheilk.*, September, 1911.)
5. Hicks: The Treatment of Phlyctenular Conjunctivitis. (*Ophthalmic Record*, May, 1911.)
6. Kaz: Eserine and Atropine in Diseases of the Cornea. (*Klin. Monatsbl. fuer Augenheilk.*, March, 1912.)
7. Lacapère: The Action of Salvarsan in Tabetic Optic Neuritis. (*Gazette des Hôpitaux*, January 25th, 1912.)
8. Lang: A Clinical Lecture on the Treatment of Gonorrheal Iritis by Vaccines. (*Archives of the Middlesex Hospital*, Vol. XXII, Clinical Series, No. VII, 1911.)
9. Mitchell: Rodent Ulcer Treated with Carbon-Dioxide Snow. (*Trans. Oph. Soc., U. K.*, Vol. XXXII, Fasc. 1, p. 80, 1912.)
10. Rohmer: The Effect of Injections of Sterilized Air into the Vitreous in Detachment of the Retina. (*Archives d'Ophtalmologie*, May, 1912.)
11. Ruhemann: On a Chemical Method for Obviating Dazzling of the Eyes. (*Berl. klin. Wochenschr.*, July 3rd, 1911.)
12. Ryerson: On the Use of Radium in Ophthalmology. (*Canadian Medical Association Journ.*, December, 1911.)
13. Stock: Benzosalin in Sympathetic Ophthalmia. (*Klin. Monatsbl. fuer Augenheilk.*, October, 1911.)
14. Theobald: A Protest Against the Indiscriminate Use of the Organic Compounds of Silver in Ophthalmic Practice. (*Bulletin Johns Hopkins Hospital*, November, 1911.)
15. Van Lint: Preoperative Treatment of a Tuberculous Dacryocystitis by Means of Bismuth Paste. (*La Clinique Ophtalmologique*, March 10th, 1912.)
16. Wyler: Recurring Corneal Erosions. (*Ophthalmology*, July, 1911.)

Many oculists will concur in Theobald's protest against the indiscriminate use of the organic compounds of silver in eye work. Formerly, it was rare to see silver staining of the conjunctiva except in cases of

chronic trachoma where the nitrate had been used over long periods. The current practice of giving to patients solutions of these organic silver preparations for home use is responsible for the greater number of cases of argyria. The reviewer is heartily in accord with Theobald's view, that in acute and chronic catarrhal conjunctivitis mild astringent collyria—such as zinc sulphate and boric acid—are far more efficacious than any of the organic silver preparations.

For the purpose of protecting the eyes from ultra-violet-rays, Ruhemann has employed a soluble monoxide derivative of *æsculin*, neutralized with boric acid. (For the same purpose, Hammer, in 1891, recommended a solution of quinine bisulphate.) Ruhemann's solution under the trade name '*aqua zeozoni*' causes no irritation, does not stain and lessens photophobia. It may be used three times a day for prolonged periods. It may be employed with advantage in conjunctivitis, incipient cataract, etc., and prophylactically in snow blindness, sea dazzling, electric ophthalmia, and glass-blower's cataract.

Mitchell successfully treated 3 cases of rodent ulcer of the eyelid with carbon-dioxide snow. The author emphasizes the importance of treating the edges rather than the base of the lesion.

In Ryerson's experience naked radium should never be applied to the eye, except in cases of epithelioma. Under all other circumstances its rays should be filtered through lead, tin, or aluminum. The apparatus containing the radium bromide should be held in contact with the part for ten or fifteen minutes. The application may be repeated daily. Rodent ulcers, angiomas, sarcomas, epitheliomas, trachoma, spring catarrh, lupus of the conjunctiva, corneal ulcers, iritis and uveitis have responded favorably to radium emanations.

Where conjunctival phlyctenules are large in size and few in number, Hicks advocates excision of the lesions. He makes a triangular incision quite clear of the phlycten, which he dissects off, and the cut edges are then brought together with silk sutures. This treatment is not advocated in the multiple form of phlyctenular conjunctivitis. In this type curettage after incision will be found helpful in obstinate cases.

In 8 cases of conjunctivitis neonatorum due to the gonococcus, Colombo has obtained encouraging results from the instillation of gonococcal serum. The treatment employed was bathing the eyes with bichloride lotion, swabbing the conjunctiva with silver nitrate followed by salt solution; then, after drying the lids and conjunctiva, instillation of the serum. The addition of the serum to the other treatment shortens the period of inflammation and purulent discharge, reduces the edema of the lids, and prevents the occurrence of corneal opacity. He does not think that the serum has a direct action on the organism or its toxins, but attributes its action to a reduction in the virulence of the gonococcus.

In a case of tuberculous dacryocystitis with large fistula, Van Lint thought it advisable to try to get rid of the fistula before excising the sac. He therefore injected Beck's paste (one-third bismuth subnitrate, two-thirds vaseline) into the sac via the lower canaliculus until it emerged from the upper punctum. The fistula healed completely in two weeks.

For recurring corneal erosions, Wyler rubs the denuded area with a cotton-wound probe moistened in strong chlorine water. Atropine, xeriform ointment and bandaging are used as adjuvants. The application may have to be repeated, but the results are good.

"In iritis atropine, in keratitis eserine." Thus Kaz, of St. Petersburg,

sums up his belief in the value of eserine in corneal affections. He has had unusually satisfactory results in ulcers, marginal infiltrates, deep marginal ulcers, catarrhal ulcers, hypopyon keratitis and parenchymatous keratitis. Rapid clearing of pannus trachomatosa after several days' use of eserine is claimed. In some cases atropine and eserine used alternately acted well, probably, as Kaz points out, because the atropine counteracted an excessive effect of a too strong solution of eserine. Eserine immobilizes the iris, reduces tension (even in normal eyes) and improves the drainage of the anterior chamber by opening up the angle and crypts of the iris.

In the opinion of Lang the gonococcus is the most common cause of plastic iritis, which may occur from a few months to twenty-one years after the original urethritis. Often the appearances are indistinguishable from an iritis caused by syphilis, septic poisoning, gout, etc., but occasionally grey or yellowish lymph (in Lang's opinion characteristic of gonococcal infection of the iris) will appear in the anterior chamber. In addition to the usual local treatment—atropine, leeches, moist or dry heat—Lang places great reliance upon ascending doses of gonococcus vaccines. Two doses of 200 million, of 300 million and of 500 million are given at intervals of a week, and a final dose of 1,000 million, or even a further one of 1,500 million, may end the course of treatment. These massive doses quickly dissipate the acute attack and seem to prevent recurrences.

The occasional development of toxic symptoms following the administration of massive doses of sodium salicylate in sympathetic ophthalmia led Stock to experiment with a substitute—benzosalin. This drug can be given to the extent of 20 gm. daily, in milk or water. Two cases only are reported; in both the ultimate result was good. In one there was temporary mental derangement which disappeared on withholding the drug.

Four patients with sympathetic ophthalmia were treated by injecting serum obtained from patients suffering from this disease (a method originally suggested by Zur Nedden in 1906).

In one patient six injections of 20-30 c.cm. of serum seemed to have a large share in bringing about the final favorable result: a quiet eye, with $V=20/30$. As to the 3 other cases, Derby and Pratt remark that "in none was the result sufficiently striking and could not be regarded as sure." Inasmuch as these cases all received mercurial inunctions, large doses of sodium salicylate, with atropine and hot fomentations, the share, if any, of the serum in bringing about a favorable result is problematical.

Dyes' venesection, *i. e.*, the withdrawal of a small quantity of blood only (3 gm. to each kilogram of the patient's weight), followed by diaphoresis, has been found efficacious in reducing intraocular tension in glaucoma. At the same time the blood-pressure is reduced.

In the prodromal stage of glaucoma Gilbert advocates venesection combined with miotics and careful general treatment. In established glaucoma treatment should consist in venesection followed by operation. The interval between the two should be six to twenty-four hours in glaucoma simplex, and twenty-four to forty-eight hours in inflammatory glaucoma.

Optic atrophy of tabetic origin has hitherto proved rebellious to all treatment. In spite of any and all medication vision slowly or rapidly fails to blindness. Goebel has achieved a striking success by massaging the optic nerve with an apparatus similar to a Bier vacuum cup. A bell, shaped like an eye-cup and finished with a rubber bulb, is placed over

the eye. The lids and globe are then sucked in and out, the movements synchronizing with the pulse-rate.

In the reported case (uninfluenced by classical treatment) the field in the only useful eye enlarged to the normal limits, the sense of red returned and the other color fields approached the normal. The improvement was maintained for four months from the inception of the massage.

The administration of salvarsan in incipient (or even advanced) tabes has seemed to check the progress of the malady and has certainly caused the disappearance or modification of some of the symptoms. It now appears, from 2 cases reported by Lacapère, that tabetic optic atrophy may be favorably influenced. In ordinary cases the author commences with a dose of 20 to 25 cgrm., and if the remedy is well borne, the doses named are sometimes augmented a little. He insists upon the frequent repetition of the injections given in series, otherwise the pains may reappear and the sight get worse.

One success and temporary improvement in 6 other cases of detachment of the retina (8 cases treated), following injection of sterilized air into the vitreous, are reported by Rohmer.

The air is sterilized by being drawn into a glass syringe through a glowing hollow needle. The needle is introduced into the sclera at a point opposite to the detachment, the subretinal space is then tapped with a Græfe knife, the needle is pushed further in, in order to puncture the detachment, and air is then injected into the vitreous. A maximum of $\frac{1}{2}$ c.cm. of air under a pressure not greater than 150 to 200 grm. is injected. The air is resorbed in forty-eight hours. In all cases, except one, the detachment disappeared at once, and the retina remained in place for forty-eight hours, but the detachment reappeared in 6 cases. In the successful case no detachment could be seen after four months.

DIAGNOSTIC AND THERAPEUTIC NOTES.

A NEW TREATMENT OF TUBERCULOSIS.—Friedmann (*Deutsch. med. Wochenschr.*, No. 48, 1912). On November 6th, before the Berlin Medical Society, Dr. F. F. Friedmann read a communication that may turn out to be of considerable importance, since it involves a new principle in the treatment of tuberculosis. The theoretical basis of his method consists in the hypothesis that the tuberculosis antigens reside in the bodies of the tubercle bacilli themselves, and that the most promising method of treatment consists in the injection of the living bacilli themselves. All the tuberculins have this quality in common, that they contain the bodies of tubercle bacilli more or less comminuted and more or less altered by the process of sterilization. Besides the antigens, the tuberculins also contain considerable quantities of toxins; an obvious drawback from Friedmann's point of view. He, therefore, sought to find a modified tubercle bacillus, rich in antigens but non-virulent and free from toxic substances. Such a strain of tubercle bacilli he thinks he has found. In 1903 he and Piorkowski isolated a tubercle bacillus from the body of a turtle in the Berlin Aquarium. At the time they believed this to be a special variety of the bacillus, since, while virulent for cold-blooded animals, it was entirely innocuous for warm-blooded ones. Further investigation has, however, led to the view that the water of the aquarium had become contaminated with human tuberculous sputum and that these turtle bacilli were human tubercle bacilli modified by passage through a cold-blooded organism. With this and similar strains of tubercle bacilli, Friedmann has made a vaccine, from the use of which astonishing results have been reported. The living bacilli are injected intramuscularly, a local induration resulting which is absorbed in the course of a few weeks. If, as rarely happens, an abscess forms, the injection is without therapeutic effect. This accident can be avoided by giving alternate intramuscular and intravenous injections. Up to the present, some 1,200 patients have received the treatment, one or two intramuscular injections usually sufficing. Soon after the first injection obvious signs of improvement are said to be observable, in all varieties of tuberculosis. Twelve cases of joint tuberculosis, some of them very severe in type, were healed promptly and entirely. Pulmonary tuberculosis uniformly shows prompt amelioration of all the symptoms. The first to go are usually the night-sweats; pain, cough, fever, etc. disappear later. Renal and bladder tuberculosis also do well. Cutaneous tuberculosis offers the greatest difficulties to the treatment on account of the over-sensitiveness to the injections that usually accompanies it. By means of the combination of intravenous with intramuscular injections, good results may also be obtained in this form of tuberculosis. The injections are given in the immediate neighborhood of the infected area. Good results were uniformly observed in lupus of the mucous membranes. After it had become certain that the injections were quite free from

danger, Friedmann began to inoculate children exposed to a tuberculous environment, the injection sometimes being given immediately after birth. All the 335 children, hitherto inoculated, bore the injections without ill result and have so far remained free from scrofula.

Enthusiastic reports of this sort have not been infrequent in medical literature, and we have learned to meet them with considerable scepticism. Our astonishment is therefore redoubled when we read the discussion that followed. Some of the most eminent of the Berlin clinicians confirmed Friedmann's claims. Thus Erich Mueller reported 5 cases of grave bone tuberculosis, in 3 of which the injections of Friedmann's vaccine led to a complete cure. In the other two, abscesses formed at the site of injection. Schleich stated that he had lost his early scepticism, regarding the treatment, after seeing a number of cases of surgical tuberculosis recover without operation. Katzenstein had had the same experience. Karfunkel confirmed Friedmann's statements in every detail. He had treated 450 cases, including all varieties of tuberculosis, with uniform success. In 200 cases of pulmonary phthisis, not a single one failed to show improvement. Kuester was equally enthusiastic and considered Friedmann's vaccine at least equal to that of Jenner in importance. Blaschko reported a case of cutaneous tuberculosis that had previously resisted all methods of treatment, including tuberculin, but which appeared to be yielding to the new vaccine. Citron spoke of the theoretical justification for Friedmann's method. Goldberg had seen 23 cases of pulmonary tuberculosis recover completely under this treatment.

Some other speakers were more critical. Thus Orth stated that while tuberculous guinea-pigs, treated with the vaccine, lived longer than the controls, all of the infected animals died eventually. Klemperer, while admitting the apparent significance of Friedmann's work, took a rather conservative attitude. Goldscheider demanded more evidence of an anatomical cure in pulmonary tuberculosis before admitting the vaccine to be a specific. Schenk spoke of a patient with a tuberculous ulcer of the bladder who had been referred to Friedmann for treatment. She had been sent back as cured, but the ulcer was as large as ever and growing. Three questions were propounded, which however Friedmann did not attempt to answer. They were:—

1. What is the dosage of the new remedy, and when will it be made accessible to the medical profession? (Bier.)

2. How do the tuberculin reactions behave in the cured cases? (Meyer.)

3. Why do abscesses sometimes follow the injections and how can a cure take place without the occurrence of reactions? (Wolff-Eisner.)

From the daily press we learn that Dr. Friedmann is being bombarded with the most seductive offers from American pharmaceutical houses, and that it will doubtless not be long before the vaccine is placed on the market. While an undue amount of credulity towards the claims made for new remedies is to be deprecated, it may well be that Friedmann's discovery will prove of great therapeutic importance.

A SIMPLIFICATION OF THE HEMIN TEST.—Nippe (*Deutsch. med. Wochenschr.*, No. 47, 1912). The hemin test for blood, while less delicate and less unambiguous than some other tests, has the special advantage that the hemin crystals can be permanently mounted on the slide and filed away as a record. The usual methods of preparing these crystals from a

blood-stain or similar object are susceptible of improvement. When sodium chloride crystals are used, disturbing crystals of this salt are almost unavoidable, while an aqueous solution of the salt has still other disadvantages. The writer has found the following formula most useful:—

Potassium bromide.	0.1
Potassium iodide.	0.1
Potassium chloride.	0.1
Glacial acetic acid.	100.0

A drop of this is mixed on a slide with a little of the suspected substance; a cover-glass is placed over the mixture, and the whole heated to boiling. On cooling, if blood be present, numerous large and characteristic hemin crystals promptly make their appearance.

A NEW METHOD OF REMOVING FACIAL HAIR IN WOMEN.—Schwenter-Trachsler (*Arch. fuer Derm. und Syph.*, Vol. 3). The hairy areas are rubbed twice daily with a piece of pumice stone and then anointed with some bland salve. This procedure, while tedious since it must be kept up for weeks, often results in a permanent removal of the hairiness.

COMBINED TREATMENT OF PERNICIOUS ANEMIA.—Brieger (*Deutsch. med. Wochenschr.*, No. 46, 1912). Having observed the frequent occurrence of remarkable amounts of antitrypsin in the blood of pernicious anemia, Brieger has for some time been giving pancreatin in addition to the usual arsenic. He prescribes the latter, as Fowler's solution, in doses beginning with 2 drops after meals and slowly rising to 8 drops three times daily. The pancreatin (J. D. Riedel) is given before meals in doses of a few grains. He reports 3 cases in which this treatment produced striking improvement.

THE DETECTION OF FAT IN STOOL.—Seathoff (*Muench. med. Wochenschr.*, No. 44, 1912). A piece of stool, about the size of a pea, is rubbed up on a slide with a little of a solution consisting of 90 c.cm. glacial acetic acid, 10 c.cm. 96 per cent. alcohol, and as much sudan red as will go on the point of a knife. A cover-glass is placed over the mixture and the whole warmed for half a minute over the flame, whereupon it is examined microscopically. Fat, if present, appears as bright yellow or red droplets.

OCCULT BLOOD IN STOOL.—Fuld (*Berl. klin. Wochenschr.*, No. 44, 1912). The stool is rubbed up with water until fluid, and of this 2 c.cm. are placed in a test-tube; 10 drops of glacial acetic acid and 4 c.cm. of ether are added and the whole thoroughly shaken. The supernatant ethereal extract is poured into another test-tube, a little powdered gum guaiac is added, the mixture shaken. Finally some old oil of turpentine is al-

lowed to run down the inclined test-tube forming a sharply defined layer underneath the ethereal extract. In the presence of blood a blue ring forms at the zone of contact. While sensitive enough for all practical purposes, the test is not so delicate that the patient need abstain from well-cooked meat, since only considerable quantities of raw or underdone meat in the food will give rise to a positive reaction in the stool.

TREATMENT OF EPISTAXIS.—Ritschl (*Muench. med. Wochenschr.*, No. 43, 1912). The writer endorses Nægeli's method of stopping nose-bleed. With the patient sitting in a chair and the physician standing behind him, the latter places his hands under the patient's lower jaw and occiput and pulls the head firmly upward. The effect is still further increased if the upward traction is accompanied by a maximum flexion of the head backwards. The epistaxis usually ceases in a minute or two.

EXCISION OF CARBUNCLES.—Levit (*Wien. klin. Rundsch.*, Nos. 41 and 42, 1912). The writer believes that whenever possible a carbuncle should be excised *in toto*. He reports 182 cases so treated. Of these, 8 died, but 5 of these had diabetes, 2 diabetes and nephritis, and one well-marked sepsis. All the other cases were able to leave the hospital in seven to ten days, and were healed in four to five weeks.

THYROID TREATMENT OF STERILITY.—Weil (*Muench. med. Wochenschr.*, No. 42, 1912). In certain cases of sterility the cause of the condition may lie in a lack of correlation of function between ovaries and thyroid gland. In that event the administration of thyroid extract may be of service. Weil reports 3 cases of apparently permanent sterility, in which the administration of thyroid was followed by conception. He prescribes one 'iodothylin' tablet three times daily.

A NEW TREATMENT OF ECLAMPSIA.—Walcher (*Zentralbl. fuer Gyn.*, No. 42, 1912). Some time ago Sellheim showed that the breast played an important part in the production of eclampsia and that in this condition there was usually an excessive production of colostrum. He believes that in puerperal eclampsia there is a deposit of toxin in the breast, which the organism attempts to get rid of through the colostrum, usually ineffectively. He, therefore, advocates in such cases the amputation of one or both breasts.

Walcher believes that the same effect can be achieved by expressing the colostrum. In the school for midwives at Stuttgart, colostrum is thoroughly expressed from both breasts in all cases of eclampsia, a hypodermoclysis of saline solution being added to this treatment in some cases. In most of the 11 cases so treated, the results were satisfactory, though not in all. It would appear that this simple procedure deserves a trial in all cases of this intractable affection.

TREATMENT OF POST-OPERATIVE INTESTINAL PARALYSIS.—Pettenkofer (*Muench. med. Wochenschr.*, No. 45, 1912). A rectal tube with numerous lateral openings contains a metallic spiral. The former is connected with an irrigator, the latter with a source of Faradic or combined electric current. The patient suffering from post-operative intestinal paresis is placed in the lithotomy position, the well-lubricated tube introduced and a moderate amount of water allowed to flow into the rectum. A mild Faradic current is then allowed to pass, one electrode being the spiral in the rectal tube, the other a large ball covered with wet felt. This ball is slowly rolled over the abdomen following the course of the colon, from cecum to sigmoid. The current is allowed to rise and fall between 50 and 0 milliampères, the poles being reversed from time to time. The entire treatment is discontinued after fifteen minutes. Somewhat later, flatus usually makes its appearance, and, in all but the most desperate cases, a stool may be expected after the lapse of two or three hours. If desired, the treatment may be combined with the hypodermic administration of physostigmine.

In 5 out of 6 cases, the procedure was successful. In the sixth case, no stool resulted in spite of the production of active peristalsis. An exploratory incision showed that the failure of the treatment was due to the presence of adhesions leading to complete mechanical obstruction.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

Tuberculosis, as a subject for discussion, has of late perhaps attracted even more than its usual meed of attention in London; no doubt in great measure because our State, through the Insurance Act, has now definitely entered on an organized campaign against what has, so picturesquely, been called 'The Great White Plague.' And, while the various sanitary authorities now actively engaged in arranging the provision of tuberculosis benefits for the insured members of the proletariat, some medical men are becoming a little uneasy lest it may be found that we are confusing two different objectives—the alleviation, or cure of individual cases of phthisis, and the eradication of tuberculosis, using the term in its widest application. For our notions of what tuberculosis really is are undergoing rapid extension, with, at the same time, a resuscitation, on a more scientific footing, of the older doctrines of scrofula and 'pre-tuberculous disease.' Dr. Nietner, the General Secretary of the German Central Committee for the Prevention of Tuberculosis, lately delivered, in London, an address, that may be found in the *Lancet* of November 16th, 1912. wherein he quoted Schlossmann's dictum that tuberculosis is a true children's disease: acquired in childhood, to be prevented during childhood, treated during childhood, and healed during childhood. He threw, moreover, the whole weight of his authority into the scale against the notion of the importance of milk-infection, recommending concentration on the prevention of infection through contact with tuberculous adults. On the other hand, Prof. Sheridan Delépine, of Manchester, in a paper that has just been circulated, insists that not less than 25 per cent. of the tuberculous children under five years of age, and probably even more, do suffer from disease of bovine origin. Perhaps there are differences between the methods of infection in Germany and those in England! But the mass of the profession here is still tenacious of the milk-infection theory; and a little slow to recognize tuberculosis in childhood unless the signs are well marked. The Edinburgh school, lead by Dr. Philip, has been more advanced; for London, in spite of its vastness, or perhaps because of it, is in many ways more provincial than the provinces; and the influence of the unorthodox, or the pioneers, tends to be confined for many years to a limited circle. There was, in the *British Medical Journal* of November 23rd, 1912, an able paper by Dr. Sutherland, one of Dr. Philip's enthusiastic disciples, dealing, in a very fresh and striking manner, with some problems of tuberculosis. He is inclined to recognize the existence of actual apical phthisis in children, on grounds that may seem to some insufficient; and

the physical signs on which he relies may not be thought to be other than those which French physicians consider the concomitants of pulmonary apical collapse due to 'adenism.' But then there are Frenchmen who declare that adenism itself is only a manifestation of scrofula.

A very notable contribution to the statistical study of tuberculosis was made last month by Dr. Hamer, on assuming the presidential chair of the Epidemiological Section of the Royal Society of Medicine. Dr. Hamer, who is Medical Officer of Health for the County of London—an administrative unit corresponding to Greater New York—has a capacity for independent thought which is well recognized as is his wide learning and critical ability. And, in his paper, which is published in the Proceedings of the Society for November, he tells us that a reinvestigation of the work done by the late Dr. Buchanan in the 'sixties, on the association of phthisis, as a cause of death, with certain soil-conditions, has reinforced his belief that the prevention of the disease involves something more than the "circumvention of a bacillus." Moreover, from a study of the curious bearing, on statistical results, of migratory movements of sections of the population, he has shown us that apparent lowness, or the reverse, of a phthisis death-rate, may not always mean what it seems to at first sight. For instance, the figures for Sussex have for long been influenced by the fact that, with the enormous growth of Brighton as a residential town, many scores of girls were drafted from their native villages to act as domestic servants therein, returning later to die at home of phthisis. Obviously, under these circumstances, it is extremely difficult to draw accurate conclusions as to the relative phthisis-morbidity of the big town, and the little hamlets. A few days ago, there was another discussion on tuberculosis, which will appear in the Proceedings for December, and on this occasion opportunity was taken to bring forward the notions of McConkey, published in the *Medical Record* of October 28th, 1911, and some of the later teachings of Poncet, Calmette and Robin. Poncet, of Lyons, whose book on "La Tuberculose Inflammatoire" has lately been published in Paris, has, as all the world knows, some very striking ideas as to the tubercular nature of many affections that we are not in the habit of regarding as demonstrably connected with the bacillus of Koch. It is true that much of his clinical evidence is weak; yet his book carries conviction to those who have never quite lost faith in the manifestations of what we used to call the 'scrofulous diathesis.' And the specialists—the oculists, the dermatologists, and the gynecologists—are, many of them, rallying to his side. Moreover, the work now proceeding in Germany and Italy, on the life history of the tubercle bacillus, is calculated to give us pause if we are inclined, too hastily, to assume that without the presence of Koch's bacillus, as we know it now, a lesion cannot be tubercular. Costantini, in *La Riforma Medica* of October 12th, 1912, expresses his belief in great part of Much's work; and regards the occurrence of a Gram-positive coccus-like stage in the organism's life history (in the tissues of the host) as proved. And there are other reports suggesting that we may have to recognize also, as some claim for the bacillus of leprosy, a non-acid-fast bacillus stage of the tubercle bacillus. So it seems, on the whole, that, as the workers at Davos Platz have long claimed, we must recognize at least the polymorphic nature of Koch's bacillus; and, if it be indeed true that it may exist in the human body in non-acid-fast and coccus-like forms, it is possible that many of Poncet's views will be proved correct, and that the difficulties referred to by Sir Clifford Allbutt, in his masterly lecture on

the relation of pleurisy to tubercle (*Lancet*, November 30th, 1912), will soon be resolved. There is much that is, or that seems to be, contradictory, now being given to the world; Calmette's paper in the *Universal Medical Record* for April, 1912, and Maynard's vigorous argument in the *South African Medical Record* are in many ways opposed, yet both demand attention, and thought. But, on the whole, it may be said that the undoubted tendency is to push back the date of the initial infection yet nearer and nearer to birth; to lay more and more stress on the diathesis, whether it be regarded as the expression of an inherited or transmitted tendency, or as a result of early infection itself; and to admit a wider sphere of action for the tubercle bacillus in the way of producing lesions and conditions, in which there are no tubercles and perhaps no bacilli, than we have cared to lately. Lastly, there is the question of reinfections. Calmette, as we all know, looks upon reinfections as the cause of phthisis developing from tuberculosis. But Metchnikoff, who lately delivered here in London a vigorous and masterly oration on the whole subject, seems to regard reinfections with benign or peculiar strains of tubercle bacilli as really beneficent, and therapeutic; saving many a child, infected with a virulent strain, from progressive development of the disease.

The venerable biologist's address which was delivered in French, with much energy, will soon appear in the guise of a translation by Sir E. Ray Lankester, and we shall then all have an opportunity of studying his views at greater leisure.

It is earnestly to be hoped that there will soon be some approximation to a mean of opinion; but it must be admitted that, at the present moment, it is hard, amongst the clash of the voices of eager workers, to ascertain the truth in its entirety.

December 10th.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The December meeting of the St. Louis Medical Science Club was held at the Barnard (Free) Skin and Cancer Hospital, Tuesday evening, December 10th, at 8:15 p. m. Dr. Leo Loeb presided. The following program was given:—

1. Inhibition of Hemolysis by the Serum of Cancerous Individuals. W. O. Sweek and Moyer S. Fleisher
2. The Effect of Strong Catharsis on Blood-Pressure and the Heart. Chas. Hugh Neilson and Robert F. Hyland
3. A Study of Autoplastic and Homeoplastic Transplanted Kidney Tissue. Max W. Myer
4. The Variations in Percentages of Growth and Growth-Energy of Transplanted Tumors. Moyer S. Fleisher

(Signed) W. E. GARREY, *Secretary*.

INHIBITION OF HEMOLYSIS BY THE SERUM OF CANCEROUS INDIVIDUALS.

By W. O. SWEET, M. D., AND MOYER S. FLEISHER, M. D., of St. Louis.

Goldberger in investigating the hemolytic action of various acids found that the serum of cancer patients possessed a greater antihemolytic activity than the serum of normal individuals, or individuals suffering from diseases other than cancer. He used lactic and oleic acids in these experiments.

We have repeated Goldberger's experiments with serum from cancerous and normal individuals.

We did not find any marked increase of the antihemolytic power of the serum of cancerous patients. It is, therefore, evident that the determination of the antihemolytic activity of the serum of cancerous patients will not serve as a diagnostic method.

It is doubtful whether an increased antihemolytic activity exists in the sera of cancerous patients; it is certain that this property is not increased in all cases, and it also appears from our experiments that the antihemolytic property of normal individuals, living under uncontrolled conditions, varies within rather wide limits.

THE EFFECT OF STRONG CATHARSIS ON BLOOD-PRESSURE AND THE HEART.

By CHAS. HUGH NEILSON, M. D., AND ROBERT F. HYLAND, of St. Louis.

The indiscriminate use of strong cathartics for depletion of the body fluids in the treatment of anasarca is dangerous. This danger lies in

the lowered blood-pressure and the weakening effect on the heart. Sir James Barr, Ritter, and W. Jaworski warn against the strong purging as a somewhat dangerous procedure.

We carried out a series of experiments on 200 individuals. In these experiments we tried the effect of magnesium sulphate, sodium sulphate, Rochelle salts, and compound jalap powder on the systolic and diastolic blood-pressure, on the rate and character of the heart-beat.

The cathartics were given at 7:00 a. m.; no breakfast was allowed. The patients were kept in bed and the blood-pressure, etc., were taken before the salts were given, and afterwards at intervals of one or two hours until 4:00 p. m. The systolic and diastolic readings were made with the auscultatory method of Korotoff.

1. The effects of strong purging on the systolic pressure of those with high, medium, and low initial pressures were as follow. Of 126 patients tested, 109 showed a lowering of the systolic pressure from 5 to 45 per cent.; 12 showed practically no change; 5 showed an increase. In the majority of cases the systolic pressure was lower than the normal at the end of twenty-four hours. There was, however, a gradual increase in the pressure from the low pressure produced by the free catharsis.

2. The effects of strong catharsis on the systolic, diastolic, and pulse pressure, and also on the rate and rhythmicity of the heart-beat, were as follow. The systolic pressure was to the same extent as in the preceding experiments. The diastolic pressure was lowered 8 per cent. and the pulse-pressure 24 per cent. The number of heart-beats was lowered 14 per cent. as a whole, 69 patients being tested in this set of experiments.

Many individuals showed much greater changes than the percentages mentioned, which were the average percentages of all the individuals tested. In a number of individuals arrhythmias developed, particularly in those with sclerosis with a high initial pressure, and in those with a low initial pressure. Approximately 5 per cent. developed an arrhythmia. It is in the individuals, where the blood-pressure changes are most marked, that we most frequently get the development of an arrhythmia or the increase of an arrhythmia already present. Increased weakness of the heart is produced in 8 to 9 per cent. of the total, since the heart-beats increase in bed, and the increase when standing is less than the normal.

The results from this set of experiments, supported by the clinical fact that patients with anasarca due to diseased hearts, nephritis, and other causes, often become worse, warrants the assumption that all cases, where severe purging is done for depletion of the blood, should be controlled by carefully watching the blood-pressure and condition of the heart.

A STUDY OF AUTOPLASTIC AND HOMEOPLASTIC TRANSPLANTED KIDNEY TISSUE.

By MAX W. MYER, A. B., M. D., of St. Louis.

It has been the aim, in this work on the study of transplanted kidney tissue, to determine three factors—namely, the exact time relation in regeneration, comparison of autoplasmic and homeoplasmic transplants, and lastly the effect of compensatory hypertrophy of the intact kidney upon the transplanted tissue.

The experiments were carried out on guinea-pigs. The kidney tissue was transplanted into small pockets in the ears. This tissue was taken for examination at twenty-four-hour-intervals for five days, after this on the seventh, fourteenth, twenty-first, twenty-fifth and twenty-seventh days.

There are three series; two representing autoplasmic and one homeoplastic transplants. In one of the autoplasmic transplants an entire kidney was removed and in the other one-third of one kidney. About twenty-five animals were employed in each series, giving a large amount of material for study.

Living tissue, leaving a central area of necrosis, is noted on the periphery of the pieces examined as early as twenty-four hours. Throughout the entire series this peripheral zone of activity and central necrotic zone are present, varying only in degree with the later stages. The necrotic area is gradually diminished by the invasion of the fibroblasts from the periphery, and almost entirely disappears at the end of twenty-one days.

Mitoses in the tubule-cells are first noted after three days, reaching the maximum between the fifth and seventh days. The first well-developed tubules are seen after four days, and from this time rapidly develop until after the seventh day. A very marked development of fibroblasts is noted at this stage of activity of the kidney cells. The invading fibroblasts from the host tissue are responsible for the nourishment; hence, the marked activity in the kidney tissue. By the fourteenth day mitoses are seen only occasionally, and these are chiefly in the connective-tissue, thus showing a cessation of activity in the kidney tissue. At the same time the number of regenerated tubules is decreasing, due to a compression by the surrounding connective-tissue. After about twenty-five days all of them disappear.

There is no appreciable difference between the autoplasmic and homeoplastic tissue until after the seventh day, when a more rapid destruction of the regenerated tubules in the homeoplastic is very noticeable, and is complete after twenty-one days.

The autoplasmic tissue in which one-third of one kidney has been removed shows a greater activity than the other autoplasmic series. The justifiable inference, from the observation of the three series, is that compensating hypertrophy has no beneficial effect upon the transplanted tissue.

THE VARIATIONS IN PERCENTAGES OF GROWTH AND GROWTH-ENERGY OF TRANSPLANTED TUMORS.

By MOYER S. FLEISHER, M. D., of St. Louis.

Bashford, Murray and Bowen have maintained that, in the course of transplantation of a tumor of a mouse, rhythmical rises and falls in the percentages of growing tumors may be noted. Calkins, in part, substantiates their findings, but further claims that these rhythms become even more evident in studying the growth-energy of tumors as measured by the length of time elapsing between inoculation and death of the inoculated mice, or the period elapsing between inoculation and the time the tumors had grown to sufficient size to be used for further inoculation.

The variations in percentages of growth and growth-energy of an adenocarcinoma of a mouse have been studied. In the transplantation

of this tumor during thirty generations no definite evidence of a rhythmical rise and fall of the percentage of growing tumors was to be noted.

No rhythmical variations in the growth-energy, as measured by the size of the tumors five weeks after inoculation, was noted. Calkins' measure of growth-energy, based upon the death of the mouse and the time the tumors were used for inoculation, is arbitrary and inexact, since many factors not connected with the growth of the tumor may influence these measures.

Variations of the percentage of growing tumors were noted in the transplantation of the adenocarcinoma of the mouse used in these experiments, not only from generation to generation, but also in different series of the same generation. The large majority of these variations were within the limits of experimental error.

Variations in the growth-energy of this adenocarcinoma were noted in different generations and within one generation. The variations were less marked than were the variations in the percentage of growing tumors.

It would seem that the phenomena, which Bashford and his co-workers have considered as rhythmical changes in the tumor, are really nothing but variations dependent upon some factor or factors which at the present time are unknown and uncontrolled.

In part, these variations may be due to difference in the race of the mice used for inoculation, as suggested by Tyzzer, but certainly this is not the main factor, as in the experiments here discussed it could have played no part.

Furthermore, periodical activities of certain tissues of the inoculated part may also be of influence, as Tyzzer has suggested.

The possible arising, within a strain of mice, of a 'pure line,' similar to Cuenot and Mercur's 'rich,' 'poor' and 'medium lines,' may influence the percentage of growing tumors.

It is certain that these variations are not entirely dependent upon qualities inherent in the tumor or its cells; and it is probable that factors within the individual mice are of greater importance in producing the variations, both in percentage of growth and growth-energy of transplanted tumors.

There is no evidence that tumors or tumor cells show rhythmical changes in activity of cell division as do certain protozoans.

BOOK REVIEWS.

PREVENTABLE CANCER. A Statistical Research. By Rollo Russell. New York and London: Longmans, Green and Company. 1912. Price, \$1.50.

The reviewer has the misfortune to be unacquainted with the author of this book and to be uninformed as to the class of readers he wishes to reach. Like many books which aim to prove certain points by the aid of statistics, this one is most misleading. Most of the facts may be true, and it may also be true that removal of irritative influences will lower the incidence of cancer; but an argument which tries to prove that cancer of the uterus is dependent on dietary indiscretions is far-fetched, indeed. The word 'rheumatism' is indiscriminately used throughout the volume; and when the reader realizes that under this name are classed at least half a dozen clinical entities, then the generalities indulged in by the author become apparent. From the standpoint of modern science, Russell's contention that "the idea of an inevitable cause, apart from the factors of habit, is an unnecessary and deceptive assumption" cannot be too strongly condemned.

On the whole, we would say of the book that it contains nothing new as regards the relation between incidence of cancer and irritation, but that the conclusions drawn from the statistics are so far-reaching as to be misleading. They would, however, adorn the columns of a daily paper.

NEW ASPECTS OF DIABETES. Pathology and Treatment. By Prof. Dr. Carl von Noorden, Professor of the First Medical Clinic, Vienna. Lectures Delivered at the New York Post-Graduate Medical School, New York. New York: E. B. Treat and Company. 1912.

There is probably no disease in which a little acquaintance, on the part of the physician, with recent work in metabolism results in so much benefit to the patient as in diabetes. In this affection, the ability of the body to manage the carbohydrate portion of the food is more or less gravely interfered with. Except in the most severe cases, a proper regimen may greatly increase the ability of the patient to utilize starches, whereas an improper dietary may cause a rapid aggravation of the disease. Rigid diet, partly restricted diet, oatmeal diet, milk and vegetable days, fast days, all have their clear indications. Much of our knowledge of these matters we owe to von Noorden and his pupils, and the presentation of the subject by the Viennese professor is that of an authority and is based upon an enormous personal experience. In a condensed and yet detailed fashion he presents the subject in a book of some 160 pages, the careful study of which will enable any physician to treat this disease in a thoroughly rational manner.

CLINICAL METHODS. A Guide to the Practical Study of Medicine. By Robert Hutchison, M. D., F. R. C. P., Physician to the London Hospital, and Assistant Physician to the Hospital for Sick Children, Great Ormond Street, and Harry Rainy, M. D., F. R. C. P. Ed., F. R. S. E., Assistant Physician to the Royal Infirmary, Edinburgh. With 11 Colored Plates and 148 Figures in the Text. Fourth Edition, Thoroughly Revised. New York: Funk and Wagnalls Company. 1910. Price, \$2.50.

Of the making of books on clinical methods there is no end. The popularity of Hutchison and Rainy's manual is evidenced by the fact that a fourth edition has been called for. Its chief merit is its concentration. Within the compass of a volume that may be slipped into the pocket is comprised an account of the technique of case taking, of physical diagnosis, and of the principal laboratory methods. The amount of space devoted to the various divisions of the subject is not quite in accord with modern views. Thus over twelve pages are devoted to the nearly useless recording, by graphic methods, of the radial

pulse; five pages to the rarely useful determination of urea; while the Wassermann test and the x-ray methods are not even mentioned. It may be questioned whether books of this sort really fill a need.

STATE BOARD EXAMINATION QUESTIONS AND ANSWERS OF THE UNITED STATES AND CANADA. Practical Work Giving Authentic Questions and Authoritative Answers in Full That Will Prove Helpful in Passing State Board Examinations. Reprinted from the *Medical Record*. Fourth Edition. Thoroughly Revised. Every Question Answered in Full. New York: William Wood and Co. 1912. Price, \$3.00.

While cramming is in itself to be deprecated, it unfortunately sometimes becomes necessary when state board examinations are impending. Those who have this ordeal before them will find in this collection of questions and answers a useful means of brushing up their medical knowledge.

HANDBUCH DER GYNAEKOLOGIE. Herausgegeben von J. Veit, Halle. Zweite Voellig Umgearbeitete Auflage. Fuenfter (Schluss)-Band. Mit 116 Abbildungen im Text und Auf 20 Tafeln. Wiesbaden. Verlag von J. F. Bergmann. Price of Entire Work in Seven Volumes, bound: 128.80 m.

This volume of over 700 pages contains the following contributions: Nervous and Mental Diseases of Pregnancy and Puerperium by Anton; Etiology and Pathology of Diseases of the Tube by Fromme and Heynemann; Diagnosis and Therapy of Diseases of the Tube by Veit; Diseases of the Pelvic Connective-Tissue by R. Freund; and Normal Development of the Female Sexual Organs by Spuler.

A carefully prepared index and a list of the names of all authors quoted completes this volume, the fifth and last of the entire work. Veit's "Handbook of Gynecology," the product of a coöperative effort of some of the best German gynecologists, reflects, in this completed second edition, the most advanced teachings. It is to-day the most reliable guide extant, both for the general practitioner and specialist seeking information on any gynecological question.

PRAKTISCHE ERGEBNISSE DER GEBURTSHILFE UND GYNAEKOLOGIE. Bearbeitet von K. Basch, Prag; C. Hahl, Helsingfors; Th. Heynemann, Halle a. S.; Th. Jaschke, Duesseldorf; J. Veit, Halle a. S.; P. Zweifel, Leipzig. Herausgegeben von E. Bumm, Berlin, A. Doederlein, Muenchen, K. Franz, Berlin, und J. Veit, Halle. Vierter Jahrgang. Zweites Heft. Mit 3 Tafeln. Wiesbaden: Verlag von J. F. Bergmann. 1912. Price, 6 m.

Nothing can prove more conclusively the practical value of this latest of German gynecological periodicals than a list of the articles appearing in this second number of the fourth volume: The Practical Importance of Various Types of Chronic Myocardic Insufficieny for Gynecology by Jaschke; The Treatment of Placenta Previa by Heynemann; The Use of Pituitrin in Obstetric Practice by Hahl; Trendelenburg's Position and Pulmonary Embolism by Zweifel; The Choice and Change of Wet-nurses by Basch; Operative Treatment of Puerperal Pyemia by Veit. The general scheme adopted by each contributor is to review critically the literature on a special subject and then compare the results of others with those obtained in his own work.

THE HEALTHY BABY. The Care and Feeding of Infants in Sickness and Health. By Roger H. Dennett, M. D., Instructor in Diseases of Children in the New York Post-Graduate Medical School; Assistant Attending Physician to the Babies' Wards in the New York Post-Graduate Hospital, etc. New York: The Macmillan Company. 1912. Price, \$1.00.

In these days of preventive medicine, the care of the baby assumes increasing importance from year to year. This book is really a welcome addition to the large list of works on the subject on the care of the baby, because of its completeness, of its clearness of style, and because of the wealth of information not to be found in many books of similar character.

The chapters on training and discipline, habits, and the sections on common ailments and feeding and diet, are of particular value. The full collection of lists and tables of various kinds with place for memoranda forms a fitting close of a really good book.

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EDITORIAL.

VERBOMANIA: THE DISEASE OF TO-DAY.

It would seem even after a cursory examination of our textbooks and dictionaries that the number of diseases which are to-day chronicled should suffice; but such is the desire of all men in the pursuit of knowledge that the goad of which they are most enamored is the one which is productive of burdening the already weary medical mind with new terms and new interpretations, so that the educative factor in a physician's career shall not become a negligible quantity. The latest addition to our knowledge of various diseases—and we write latest guardedly lest some wiser person than ourselves might hold us up to ridicule on account of our lack of exact information—is a chapter in psychopathy that has been left to lie fallow too long, since it is applicable to one of our greatest national sins, a sin that has been commented upon by all visitors from abroad, from Mrs. Trollope to Pierre Loti—namely, our talkativeness on all subjects, born, as we defensively put it when too severely criticized by foreigners, by our unquenchable thirst for knowledge, but construed by these same foreigners as a blot on our civilization. And just because we have not mended our ways, even though the remarks from our critics have been far from gallant—perhaps their severity and acrimony have made us more obdurate—should we be averse from cogitating over what is contained in the 276 pages of Dr. Ossip-Lourié's recently published book in which he not only defines verbomania, but tells us how mankind is to rid itself of a disease that is permeating all ranks of society? Surely not; for here may be found not only the etiology of the disturbance, scientifically expressed, but such simple means to combat it that we cannot but be moved to some show of a willingness to reform now that the lustration, out of which we may emerge as a more gracious

and a more normal nation, is prepared by one who belongs to the medical ranks!

No doubt by now it will be asked by the reader of the foregoing lines what really constitutes this strange disease, and why it required these many years for an investigator to arise, who would lay bare its causes and then allay our fears by an assurance of its curability. If, as Dr. Ossip-Lourié contends, the disease develops in families, cafés, restaurants, at banquets and lectures, we are really not assuming too much in stating that, with the exception of the last, not one of these is peculiar to modern life, since each was undoubtedly an integral part of life as lived in large cities many decades back. Hence the stigma of modernity must be withheld; which is very fortunate, indeed, for has not the medical press latterly teemed with alarming statements in connection with the grave disturbances entailed by our present-day frenetic mode of life? But though this can be asseverated, it does not belittle the importance of the disease in the author's mind, nor does it rob it of all those alluring qualities—again, according to the author—which have the power to hold the medical mind as in a thrall.

To talk too much and converse too little has characterized other nations besides the American nation; but even though unforgetful of a national pride that should inhere in each and every one of us, it must be admitted that our talkativeness very often, alas! approaches Dr. Ossip-Lourié's definition of verbomania. Take our banquets, for instance. Who of ordinary intelligence has not remarked the interminable phraseology of the men called upon to speak—the desire to talk longer than a predecessor, flowery speech that would make even artificial flowers sigh were they on the banquet-board, rodomontade pushing rotomontade for place, anecdotes ricocheting across the room, and all the time the speaker's eyes dancing with pleasure when in reality they ought to be wreathed with melancholy, for is he not a perfect exemplar of verbomania? Now, if his sins would end there, who would complain; but when we think of the young and guileless men who are stretching forth invisible hands lest one word will elude their grasp, who perhaps are dreaming of the day when they too will hold a similar audience spellbound, we have again an illustration of how the disease may arise, according to the author—through imitation of someone whom popular vote has pronounced an adept in verbiage. But whether verbomania occurs through custom or imitation, he who has it bears unmistakable stigmata and can be scented from afar, so to speak: an advantage, we take it, over other diseases that only too often baffle even out-of-the-ordinary intelligences in the medical profession.

The cure for this disease must be self-imposed; and though Dr. Ossip-Lourié overlooks the fact that it must be an herculean effort for an acclaimed or, for that matter, a boresome talker to cease, his advocacy of complete silence should be gratefully received by all as a humane procedure compared with what in our ignorance we thought should be meted out to the offender—was it the gag as applied by ourselves or the law as invoked by the nearest policeman? How long this silence should last must be judged by the physician in attendance; and, though he may err as to the length of time, he can easily remedy his mistake by applying this simple therapy again and again in the same case, provided the patient's tractability continues. That it should discontinue is within the bounds of reason, but on this point Dr. Ossip-Lourié is not explicit. Still, when we remember how the cure is effected, it can easily be impressed on the patient how foolhardy he is to object to some weeks of silence that have all the sweetness of solitude and none of the bitterness of drugs, and which cannot but result in his own restoration to a normal manner of talking, at least until his imitative qualities are again aroused by a lecturer, or by a speaker at a banquet.

THE PRESENT STATUS OF TREATMENT IN PNEUMONIA.

Pneumonia and malignant disease are still occupying much attention from investigators. Yet it can be said that no more baffling and mystic problems confront medical science than are met with in the attempt to solve these two questions. Often in these columns we have spoken of the advances being made, and even while we write new contributions appear; but, as regards both subjects, workers are still on the threshold of the solution. In pneumonia American investigators have been particularly active, and work is now going on in various laboratories and hospitals, which ultimately should be of the greatest value in interpreting the intricate phenomena of the disease.

Most investigators, except Morgenroth, have based their studies of pneumonia on the conception that a specific therapy is impossible without a clearer conception of the fundamental chemical and biological changes which occur in the course of an attack. Consequently most of the recent work has aimed at the solution of the first problem, leaving the therapeutic side to follow logically the discoveries of the *modus operandi* of the pneumococcus in its attack and of the means of resistance of the host. Earlier work on the subject had practically exhausted the possibilities of finding a solution through the agencies of the usual biological technique

and conceptions, and the new workers have been compelled to blaze a trail through almost virgin forests.

Among the pioneers in the newer work on pneumonia stands Rosenow, of Chicago. He has published a long series of articles in which he has reported many new facts on the relation of the components of the pneumococcus to toxicity and to proteolysis. By autolyzing pneumococci in salt solution he was able to extract a toxic substance capable of producing, in a single injection, all the phenomena of anaphylactic shock. This substance results from the action of a ferment contained in the pneumococci, and the same extracted ferment acting on other protein, such as that contained in culture media, may produce similar toxic substances. That the resulting toxic substance is due to a proteolytic ferment is shown by a complete application of some simple chemical tests. Further splitting of the pneumococcus destroys its toxic properties.

Further studies on the relations between ferment action and pneumococcus were undertaken independently by Hirschfelder, and by Jobling and Strouse. Hirschfelder treated pneumococci a short time with pancreatin and found that with the product he was able to immunize animals against subsequent pneumococcus infection. He also used this 'vaccine' therapeutically in a small series of cases of pneumonia in man, with apparently very good results. Jobling and Strouse treated pneumococci with the proteolytic ferments of leucocytes, and also found that with the substances resulting from such treatment they were able to produce immune bodies in injected animals.

The final result of all this work along similar lines cannot yet be predicted, but it seems sure that ferments must play an important rôle in protection against the pneumococcus or in curing an attack once started. Cole, however, is of the opinion that the endotoxins contained in the organism are responsible for the toxic effects of injecting extracts—an opinion hardly proved by his own experiments and contradicted by the work of other investigators. So that, on the whole, the importance of ferment action in the immunity process in pneumonia is constantly being emphasized in the same way as in other diseases and in other physiological and pathological processes.

Chemotherapy in pneumonia has also received attention and to Morgenroth we owe 'aethylhydrocupreinhydrochlorate'—a supposed specific. Wright, in a recent exhaustive study of the value of this drug, comes to the conclusion that it certainly is not a specific, though it may ameliorate symptoms or shorten the disease. To-day, from a practical standpoint, the newer studies have not advanced a direct cure, but they are rapidly pointing the way to an understanding of the disease. The few references we have mentioned represent only one side of the attack.

It may sound like a mere literary attempt to connect the older empiric studies of the various effects of certain drugs in pneumonia with the modern pharmacological researches on the same subject, yet Rosenthal in a recent article on the chemotherapy of pneumococcus infection does this very thing. The history of all the drugs which have been exploited by clinicians as a sure cure for pneumonia is somewhat bewildering, not only on account of the strong advocacy of certain drugs as specifics and then their withdrawal when enthusiasm waned, but on account of the eminence of the men who lent their laudation in support. Even Laënnec advocated huge doses of *tartarus stibiatus*, doses far in excess of present pharmacopeial maximums. Calomel as a specific, potassium nitrate, and veratrine—each had its day of glory.

The increase of polynuclear leucocytes in pneumonia led to the use of many substances supposed to encourage these cells into the vanguard of the fray between the physician and the disease. Nuclein, thymus substance, pilocarpine, oil of turpentine were among the leucocytic stimulants—some of which certainly produced more harm than good. Pilocarpine hydrochloride was for many years considered an excellent specific for pneumonia; and sodium iodide had the reputation of possessing powers to render innocuous the pneumococcus and its metabolism products in the body. Creosotal is modern enough, even to-day, to be a part of the defense of many physicians, and camphor in large doses is in fact just on the verge of common use. The colloid metals, of course, have been advocated, and results have been cited to show their efficiency. With such a long list before us the inference to be drawn is that not any one of the drugs could have been the specific, for if such had been the case others would not have been bolstered up into a pretentious position. Insufficient observation, the known variations in the mortality of this disease, and perhaps a laudable desire early to benefit the human race without proper scientific control of data, have all acted as factors in the metamorphosis of drugs, with some virtues, into specifics whose impregnability was supposed to be adamant.

Ignorance of the mode of action of a drug must be held responsible for fulsome praise of so-called specifics. If the undoubted therapeutic results, similar to those following quinine in malaria, or mercury in syphilis, could be shown, a greater degree of scientific control would be unnecessary. There have always been men who thoroughly believed that quinine in pneumonia was specific in its action, but with the many empirical objections to its use by other men, its specificity must be questioned. Now the newer school of chemotherapy attempts to solve the problem in a different way, as is instanced by Morgenroth who like Ehrlich served a long

and arduous apprenticeship before coming to the bedside. The results of his chemical and animal work were the evolution of a quinine compound—æthylhydrocupreinhydrochlorate—and a prophylactic and curative value of this drug in the handling of pneumococcus infections in mice. But it was bedside work that demonstrated that the action of the drug was less favorable in pneumonia in man, and that there was the possibility of a distinctly disagreeable association—namely, amblyopia. In summarizing to-day the subject of drug treatment of pneumonia, we can hardly assert that the results are better than they were some decades ago; but what we can assert with surety is that our methods of attacking the problem are improved, and that the future of specific therapy, either serum or drug, is not altogether visionary.

OPINION AND CRITICISM.

CANNED MEDICAL LANGUAGE.

A writer in "The Contributor's Club" of the November issue of the *Atlantic Monthly*, under the heading "Canned Language," tells a number of truths about certain expressions which should be placed under lock and key or, what perhaps would be safer, in cans that are so hermetically sealed that escape would be impossible. And, apropos of his suggestions, would it be amiss to suggest that some of the medical English, which recurs with maddening reiteration in our journals, should receive the same treatment? Who has not smiled, even laughed at some of the expressions which medical writers invariably use when describing, say, the gravity of a case, their surprise at the unexpected result in case of recovery, and the bombast and even rant that is betrayed when a weakling of four or five cases is raised by their vainglory to a giant for all to worship! We might forgive their pride at having had such and such a case, but who can forgive the poor, tattered clothing which barely covers their thoughts, clothing that has seen service time out of mind. English, as used by a large number of medical writers, would seem to be poor in expression, so poor that Latinisms and Germanisms are absolutely necessary to bolster it up into some semblance of virility.

Just why so rich a mine as is the English language should be cold-shouldered by medical writers, except for its commonplace expressions, is one of those mysteries which it would be well for some psychologist to unravel. No ordinary mortal would be capable of the feat; for, from what we have observed, only one whose understanding could reach into the darkest recesses of the medical mind could explain the abhorrence of writers for the unusual in English expression. We take it the medical man, when he sits down to put his thoughts on paper, thinks only of the fine points in the case, and is in such full enjoyment of the recollection of its difficulties and what powers he exercised to overcome them, that the expressions he uses appear to him of small moment. But could he see the grimaces of the intelligent reader whilst reading his journalistic English, he might be moved to making inquiries; and, if someone were present who had the hardihood to tell the truth, what would not be his surprise to learn that the intelligent reader is not in physical pain from some dietary indiscretion, but in mental anguish because of his disregard of what constitutes English.

If we were in possession of enough leisure we could open some of our own cans for the edification of our readers; but, on second thought, how

foolish this would be, for if once they were opened would their contents be easy of recapture? We hardly think so; for such is their adhesive quality and great allurements that they would soon find a host who would not only welcome them, but re-warm them many times to make them serviceable for yeoman's work. And since this is the case, no matter whose can is opened, we would advise all those in the medical profession, who live in fear of being bored, let us say, by "*pari passu*," "*per se*," "*modus operandi*," "rank and file in the profession," "to my great surprise the case got well," "the recovery was surprising," "my statistics cannot be questioned," "of 100 cases all but 2 recovered," "my assistant not being around I gave the anesthetic and performed the operation unassisted," "the woman had been to see several well-known oculists who diagnosed eye-strain before I discovered a growth on her turbinate," etc., to guard well their respective cans lest a slight loss of sealing-wax cause so disastrous an escape that deep regret will eventuate in melancholy.

LITERARY NOTES.

Those medical men, who had enough perspicacity to single out John Masfield's "The Everlasting Mercy" and "The Widow in the Bye Street" from the flood of books published in 1912, will not fail to find renewed interest in the work of this commanding figure in English literature as evidenced in his latest volume, "The Story of a Round House and Other Poems" (The Macmillan Company, New York). Here again Masfield is the poet of to-day, the sort who writes with a complete understanding of what the multifarious skeins which go to make up the Anglo-Saxon mind desire for their interpretation of life. It is well in its way to talk about Strindberg, Ibsen and Brieux; to acclaim them masters; but with all our enthusiasm we cannot rightly say that they are not foreign to our way of thinking. And, this being the case, how can we possibly derive as much benefit from them as from an author who is English to the backbone, who knows the English point of view, and above all knows the faults and the virtues of the Anglo-Saxon race because he has lived only the life of an Anglo-Saxon. Cosmopolitanism, though not to be too greatly decried, has spoiled many a literary man by emasculating his natural talent and enslaving him for ideals which sat upon him ungracefully. And just because this has been evident in the writings of a number of men who gave promise of outstanding work, we feel that we cannot praise too highly one who as yet has not forsaken his English point of view with all its faults, if brusqueness, a degree of coarseness that might be pointed out by the over-refined as unnecessary, a masculinity of thought unfettered by what the world might think, and fearlessness of expression are really faults. "The Story of a Round

House" takes us on board a ship and what a voyage it is! Here is no poetry for those who have fed their minds from the inexhaustible mines of poetasters, but the ineluctable clutch of circumstance, or of fate as pictured in all Greek tragedies. Some of the lights are high, but they are invariably the joyful hymns to Nature, whereas the low lights fall without exception to man. This may not be the case in the more pleasant walks of life such as are familiar to us among the cultured, but who would look for similar thoughts among a lot of seamen hardened by the life that spells work, danger, and the thought that death is never a distant call from a treacherous sea?

If any medical reader has grown weary of the scientific books on eugenics he can easily overcome the feeling by reading "The Right of the Child to Be Well Born" by George E. Dawson, Ph. D. (Funk and Wagnalls Company, New York.) In this slight volume he will read such 'advanced' ideas expressed with a sureness of touch that, provided his humor is not completely in abeyance, a fillip will be dealt it that will serve him very well when it is his misfortune to meet any 'advanced' student of eugenics, whose fearsome seriousness has deprived him of the saving grace of all mankind—humor. That eugenics should be taken seriously cannot be denied by anyone who to-day wishes to be considered intelligent; but seriousness does not mean to carry the study to those dangerous ramparts the climbing of which will surely be attended by disaster. Nor does it mean that human beings should follow the ethics of live-stock. This, indeed, seems to be the predominating note of all the 'popular' books on the subject; and, though the author of the book under consideration says many other things that are worth while, he also falls a ready prey to the obnoxious comparison. Human beings may in the past have received the wrong ethical training, but if it is wrong an imitation of what occurs in the animal world will not set it right. What would make us a cleaner people, a more considerate people for the health of future generations is, from a medical standpoint, a simple lesson that can be readily acquired provided the teacher and the pupil are in accord. But so long as discord exists—and our hopes of its discontinuance have been too often shattered to make us optimistic—the diseases, which by their transmissibility are the scourge of a people, will continue. Of course, the child has a right to be well born, if by this is meant healthy, and not what is generally meant—endowed with wealth, 'family blood,' and social position. But even granting that Ellen Key is right when she said the nineteenth century was the century of the child, we fear that the continued advocacy of the rights of children will put many wrong ideas into their heads, and make them so critical of their parents' slightest mental and physical weaknesses that living together will be out of the question. After reading this book carefully we are moved to the

thought that someone ought to write now an illuminating study of a code or telepathic conversation between mother and child whilst the latter is still *in utero*. This might lead to so decided an exposé of the father's sins that both mother and child will be 'medically' prepared to meet the father when the latter desires to argue himself 'clean' without a physician's certificate.

In "A Valiant Woman" by M. F. (Thomas W. Crowell Company, New York), the reader will be introduced to a teacher who had many admirable qualities and whose days were characterized by seriousness, loyalty to her vocation, and unremitting effort on behalf of her pupils. The author, who herself is a public school teacher in St. Louis, writes sympathetically of this teacher who continued the even tenor of her life in the face of new theories, new ideas, and the vicissitudes which fall to the lot of all. Such a life is well worth recording; but, though its impress on us may be the sort we need to-day, what with the many and revolutionary changes which are being advocated in educational circles, we cannot in all justice agree with the author's point of view in all instances. Were we to do so it would mean that we are content with what has been accomplished in our schools, and are not at all in favor of what Dr. Maria Montessori is attempting to effect by radical changes. This would mean a declaration of the perfection of a school system that has all the defects which obtain when a system is applied to all sorts and conditions of pupils, irrespective of what each should require. Of course, what the author says of Ellen Key has the usual grain of truth; but, whether one feels that the Swedish reformer's teachings are moral or immoral, what should not be forgotten is that she wrote "The Century of the Child," an epoch-making book be the point of view what it may. That she did, and did well, for out of the book have come all those ideas which to-day are making us study the mental bent of the child so that its development may be effected along natural lines. Books like "A Valiant Woman" are pleasant reading, they may assuage our ruffled nerves, they may lull us into a feeling of content. But though at times we really crave a serene attitude on the part of an author, those times occur more rarely than when the meat that is served should be well seasoned with what the world's mind most desires. And at present we desire trenchant criticisms of our public school system, not only from educators, but from those physicians who are awake to its present evils.

ORIGINAL ARTICLES.

THE DIAGNOSIS OF GALL-STONES.

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It may be wise in introducing this subject to say a few words on the theories of gall-stone formation. Naunyn holds that cholesterin, the main constituent of gall-stones, is not a product of metabolism nor a specific secretion of the liver cell, but that it is found in the secretion of all inflamed or infected mucous membranes. In cholelithiasis it originates not in the bile but in the mucous membranes of the bile passages and the destroyed or broken down epithelia. The normal cholesterin content of the bile is made innocuous by the protoplasmic poison which it holds. Naunyn further believes that the lime salts are also of similar origin; and that, without primary change in the mucosa and in its infection, these substances are not aggregated and gall-stones are never formed. Infection is a *sine qua non* according to this theory in the formation of the stone. Naunyn's theory has recently met with strong opposition. Aschoff and Bacmeister represent a new school. They hold that cholesterin is precipitated from the bile itself; that it is not necessary to have inflammatory change of the mucosa of the gall-bladder or any mucous surface in order to form the stone; but that obstruction to the outflow of bile is sufficient. Further they hold that cholesterin may be precipitated in the presence of aseptic conditions, and that inflammatory change is absolutely unnecessary. This process is dependent upon a change in the concentration of the separate bile constituents, upon an increase of cholesterin concentration, and a reduction in solubility and resorption. Pure cholesterin stones may be formed in this way. Most authorities agree that the fixed stones are unquestionably dependent upon associated infection. We may assume that in the majority of cases with infection there is (1) stasis of bile, (2) precipitation of cholesterin, (3) cleavage of albumin content, and (4) epithelial degeneration. It is a fact that in pregnant women who are particularly prone to the formation of gall-stones, all these conditions are present; this has been demonstrated by Hofbauer. In Hofbauer's cases, of course, the stone was more likely to be of the pure type and not of an infectious nature; the four conditions were always found by him.

Women are more frequently afflicted than men, the proportion being four to one. That faulty metabolism is a factor is evident, for gall-stones are frequently associated with metabolic faults. Thus diabetes is a frequent complication; also gout and rheumatoid arthritis; while gall-stones often accompany malignant disease. Gynecologists have, because of their thorough search of the abdomen, unearthed the presence of a large number of gall-stones with other abdominal conditions in which there are often disturbances of internal secretions.

Cholelithiasis or gall-stone disease occupies a position on the borderline of medicine and surgery. Very often upon the correct interpretation of acute symptoms, referable to the upper half of the abdomen, more particularly the right upper quadrant, may depend the life of the patient. A single case may present a variety of changing pictures during its course. Gall-stones may be present in the gall-bladder or bile passages for years without exciting suspicion of their presence, because of the absence of striking symptoms or objective signs. You will note that the writer uses the words 'striking symptoms' because he is fully convinced that when thorough search is made in these cases, when the history is carefully considered, some symptoms which may be slight, evanescent, almost unnoticed, will be found which offer some clue to the true state of affairs. On the other hand, these same cases may suddenly give rise to conditions threatening to life, demanding prompt recognition with equally prompt action on the part of the attendant. There is no acute or chronic lesion within the right upper quadrant of the abdomen, which may not present symptoms, acute or chronic, simulating gall-stones; while, as the writer will demonstrate, there are lesions of the appendix, pancreas, kidney, spine and cord, as well as the stomach and the duodenum, and even of the cardiovascular system, which may cloud the diagnostic horizon, creating a strong suspicion of the presence of gall-stones. The vagaries of the disease may in turn lead to changes in distant organs.

Gall-stones in the bile passages are always a menace, not only to the organ which harbors them, but they may suddenly or gradually lead to pathological processes, benign or malignant, near or distant, giving rise to unexpected and serious conditions. It has been frequently asked whether gall-stones are soluble within the body: an important question from a prognostic and therapeutic standpoint. Leading authorities agree that, if they do dissolve, the occurrence is exceedingly rare. Aschoff subscribed to this latter conclusion, while Naunyn positively denies the possibility. The unsuspecting or inexperienced are surprised by the frequency of cholelithiasis and the great diagnostic difficulties presented, when their eyes are opened to the truth. It is eminently proper, therefore, that this subject, standing on the borderline, as it does, between medicine and surgery, should be presented both by the physician and by the surgeon, ready to admit their failures and ready to assert that

early diagnosis with radical and rational treatment furnishes the keynote of success. To the serious-minded practitioner, the diagnosis of cholelithiasis, and the differentiation from the many conditions which present kindred pictures, becomes a difficult problem very often. It is not the gall-stone which we fear, but the associated infectious inflammatory changes and the mechanical disturbances caused by its presence.

The writer will limit himself in this symposium to clinical experiences, presenting facts deduced from cases which have impressed him. When we consider our statistics, we are surprised to note the frequency of gall-stones. Thus, in 5080 cases of internal disease, the writer finds 123 cases of gall-stone (2.5 per cent.); 38 cases of cholecystitis (0.7 per cent.), and 23 cases of cholangitis (0.4 per cent.). The writer's early experiences were limited mainly to the pathological study of the disease; he was impressed by the frequency of the disease and the variety of complications. He commenced practice when gall-stone surgery was in its infancy, when the gall-bladder for diagnostic and therapeutic purposes was not opened once against one hundred times to-day. Early in his career, in a publication on this subject in which he dealt with "The Vagaries of Gall-stones," he made the following statement: "The various symptom-complexes associated with paroxysmal pain in the upper abdominal regions, many of the so-called gastralgias and enteralgias when correctly interpreted, often prove to be atypical cases of cholelithiasis. The prompt acceptance of the truth of this statement promises, if acted upon by the diagnostician, to bring relief and cure to many; a conclusion justified by the brilliant results recently obtained in the field of hepatic and biliary surgery. This hope for the future is accentuated by the exhaustive studies and the growing literature on this subject." The literature, since the pioneer days, has grown enormously, and it would require too much space even to hint at the leading monographs which have interested the profession during the past twenty years. The work of the men who are pioneers in this field has contributed to the glory of medicine and surgery. Pathologists and clinicians are often surprised by the frequency with which gall-stones are associated with malignant disease of the stomach, intestines, and other abdominal viscera. It is not unusual to find chronic cardiac disease, coronary disease, arteriosclerosis and gouty conditions associated with innumerable gall-stones, within the gall-bladder or bile passages, which during life gave rise to but few symptoms or no symptoms which could be interpreted as meaning the presence of these concretions. It is equally interesting to note the frequency with which gall-stones have followed infection, more particularly typhoid infection, or have been associated with it either at the height of the disease or as an early sequel.

Persistence of symptoms after the escape or removal of gall-stones, more particularly pain, does not always indicate the presence of more stones in the gall-bladder or in the bile passages.

On several occasions, operation for the removal of gall-stones was suggested and performed with a positive history of gall-stone disease preceding. In some of these cases gall-stones escaped per rectum; at the operation no stones were found. It is a positive fact that the symptoms of biliary colic may recur in these cases, in no way differing from the initial colic which are due to adhesions or other unrecognized causes. One of the earliest cases of this kind which the writer met in practice was a woman aged about forty years. She had many attacks of gall-stone colic, was frequently jaundiced, passed gall-stones per rectum. She had a clean history; operation was suggested and accepted. The abdomen was opened by Dr. Price. We were greatly disappointed to find the gall-bladder and bile passages empty; there were evidences of ulcerative and inflammatory changes; adhesions were released; the patient made a perfect recovery after a number of weeks and has never, so far as the writer knows, had a recurrence of gall-stone colic or any symptoms of the disease.

Another experience which was equally instructive, the writer had a number of years ago in the case of a man who presented a similar history. He too passed gall-stones, had a dilated gall-bladder at one time, had all the symptoms of cholelithiasis, was operated by Dr. Miller, expecting to be relieved of gall-stones, when it was found that there were far-reaching adhesions of the gall-bladder to the duodenum, to the lower surface of the liver, and some evidences of perihepatitis. The adhesions were relieved, the gall-bladder was released, the patient never again had colic, and has continued well to the present day.

The writer could multiply these experiences. In all these cases we found the remnant of disturbances due to the previous presence of gall-stones which had been removed, had passed, or which had in some way disappeared. In many of these cases the stones escaped by an ulcerative process usually into the duodenum, less often into the colon. On the other hand, we have been disappointed to note that patients who have had colic, for which morphine had been administered, developed symptoms referable to the gall-bladder or to the bile passages, simulating true biliary colic, justifying the diagnosis of cholelithiasis; when operated no gall-stones were found. The writer remembers a similar history in the case of one of his colleagues, who, during many years, was treated for gall-stones; he had characteristic attacks, finally became a morphinist, was never operated and died of morphine poisoning. There were no gall-stones in the gall-bladder at the autopsy; that organ was empty and normal.

The writer recently saw a case which presented a similar history in which the diagnosis of gall-stone was made. One of our younger surgeons opened the gall-bladder only to be disappointed. The subsequent history proved that this woman was a morphine fiend; her pains continued after the operation and she is to-day suffering as she was before.

These cases need not surprise us when we remember the relation of the gall-bladder, liver and bile passages to the surrounding organs and to the nervous system, innervated as are these organs from three sources—namely, the pneumogastric, the phrenic and the sympathetic. It is not unnatural then for us to find reflexes radiating in many directions, symptoms which are anomalous, and difficulties of diagnosis which are almost insurmountable.

Indigestion.—Gall-stones may be present, remaining unsuspected with no symptoms other than *indigestion of a chronic type*. These types of indigestion may have acute exacerbations. The stomach may be disturbed either in its secretory, motor, or absorptive apparatus. With these types of indigestion the examination of the stomach-contents is often misleading. It is not uncommon to find hyperchlorhydria in some, in others hypersecretion and hyperacidity; in occasional cases complete absence of hydrochloric acid, in others an excess of mucus without marked disturbances in the secretory apparatus as shown by examination of stomach-contents. The writer will report one case in connection with the vagaries of gall-stones in which carcinoma of the stomach was simulated, with complete anacidity. There was pyloric obstruction due to gall-stones and adhesions. Over 60 per cent. of our cases in which the stomach-contents were examined showed hyperacidity.

Flatulence, with more or less pain and pyloric spasm, *i. e.*, gastralgia, is a frequent accompaniment of gall-stones. It is a serious question whether neuralgia of the stomach or any painful affection of the stomach ought to be attributed to a purely functional disturbance; whether in these cases there is not always some organic disease of that organ, or more frequently distant disease, such as gall-stones, duodenal ulcer, locomotor ataxia, diseases of the cardiovascular system or the spinal membranes or spine itself. Moynihan holds that an examination of cases treated by operation shows conclusively that in almost all cases of gall-stones the earliest symptoms were referable to the stomach; and he also states that "it requires the unmistakable evidence of jaundice to associate the suffering with gall-stones in the minds of all patients and the majority of physicians." Kehr says: "I cannot deny the existence of gastralgia or neuralgia of the stomach, but I am absolutely confident that the majority of the pains which are called cramps of the stomach are gall-stone colic." The writer does not subscribe fully to this statement, but it is a positive fact that, as our experiences grow, we lean more to the conclusion that there are but few cases of true gastralgia; that pains referable to that organ are very often due to some organic disturbance; and that gall-stones play an important rôle in referring pain to the organ. There are cases of gall-stones in which there are no symptoms referable to the stomach, and in which the paroxysms of pain are followed by complete immunity from chronic stomach symptoms.

Pain of Gall-Stone Disease.—The pain of gall-stone may be either (1) dull aching, (2) gall-stone colic, or (3) referred or reflex pain.

(1) In those cases in which the pain is dull and aching, it is likely to be continuous, not necessarily confined to the region of the gall-bladder, but it may be referred to the epigastrium or may radiate at times toward the back and may be associated, as are other more severe pains, with tenderness in the back near the eleventh and twelfth ribs posteriorly. It is not uncommon to have this dull-aching pain with occasional acute exacerbations of radiating pain. These pains radiate as a rule upward and outward toward the right and into the back; but pains due to gall-stone, of a dull character, may be associated with occasional pain radiating to the left. The writer has seen several cases of gall-stone disease in which the pain, even during the more severe attacks, was localized to the left hypochondrium where there was considerable sensitiveness, the hyperesthetic zone of Head being as usual localized over the area of the gall-bladder. Radiation of pain upward to the right toward the shoulder, or into the back is suggestive of gall-stones.

(2) It is unnecessary in this symposium for the writer to dwell at length on the usual symptoms of *gall-stone colic*. He must accent the fact that these pains are likely to follow some error of digestion. The characteristic radiation of pain is not to be forgotten; as a rule, it is into the back, upward toward the right shoulder. With these pains the upper right quadrant of the abdomen is abnormally tense; the abdominal muscles, particularly on the right side, are rigid; it is difficult to make any impression upon them. So tense is the wall, that the gall-bladder cannot, as a rule, be palpated. Associated with the severer colic there are often evidences of collapse; the patient has an anxious expression and is likely to be pale; may complain of vertigo; sometimes there are syncope, loss of consciousness and convulsions. The pain is often relieved by emptying the intestinal tract, occasionally by vomiting. The colic in some cases is relieved by lavage, and often all the associated symptoms are promptly controlled. In severe cases colic is associated with hiccough, annoying and depressing. After the severe colic, if thorough examination is made, it will be found that the region of the gall-bladder continues tender and hypersensitive for several days. This, the writer thinks, when associated with rigidity in the upper right quadrant of the abdomen and with more or less indigestion and anorexia, is a very important symptom of gall-stone disease. The *liver*, following an acute gall-stone colic, is very likely to be slightly enlarged. A symptom of considerable value in differential diagnosis is the persisting tenderness of the liver border and the liver covering the gall-bladder. In occasional cases, following severe colic or rarely during the colic, the gall-bladder may be palpated. In some cases the gall-bladder is promptly dilated. Occasionally an elongated gall-bladder, which holds a stone, is palpated. In some cases an elongated gall-bladder, which is loose and freely movable with sudden angulation, may give rise to symptoms simulating gall-stone colic. Cases in which the colic is severe, arising

suddenly with associated collapse, present some diagnostic difficulties. These cases may simulate the perforation of a duodenal or gastric ulcer. The usual onset, however, is associated with less evidence of collapse, the pain is less severe, is more easily controlled than is that of duodenal ulcer with perforation; and, as the writer has already said, is favorably influenced by the emptying of the stomach and the intestinal tract. The previous history is also different, so that the differential diagnosis, while in some cases exceedingly difficult, is in a measure made easier by a thorough study of the colic and its attending manifestations. The pain of duodenal ulcer is not, as a rule, gradual in its onset; it is sudden; it culminates at once into the most violent agony; the patient is very likely, if there is perforation, to show a broader area of rigidity; the abdomen is more distended; in fact, is distended out of all proportion to the distention of gall-bladder or gall-stone disease. The effacement of liver dullness may in some cases be of value, though it is not a pathognomonic symptom of perforation. Sudden cessation of pain is characteristic of gall-stone disease; this is true more particularly when the stone falls back into the bladder or in those cases in which there is a ball-valve action. The larger number of severe biliary colics, which the writer has been called to treat, have occurred during the night; patients, as a rule, are awakened from a sound sleep and find themselves suffering. Not infrequently a point of tenderness may be found midway between the umbilicus and the ninth rib on the right side. In a recent case which the writer saw in consultation, the point of greatest tenderness was directly over the appendix. To this case he will again refer when considering the diagnosis of appendicitis and the differentiation from gall-stone disease. Persistent pain in the back at Boas' point, just to the right of the twelfth rib in the interscapular or subscapular region, is always suspicious of gall-stones, whether associated with colic or not.

(3) Reflex pains due to gall-stones have already been mentioned as present in distant parts of the abdomen, thorax, the right shoulder, and occasionally in the right side of the neck, and in the precordium; these may be associated very often with obstinate constipation, or with symptoms of acid dyspepsia.

The writer heartily subscribes to Moynihan's dictum "that there is no cholelithiasis without some pain at some time during its presence." It only requires a thorough search into the history of the case to prove the truth of this statement.

Jaundice.—In the 123 cases of gall-stone disease, which serve as the foundation for this paper, jaundice was absent in the majority of cases. The writer thinks he is safe in concluding that jaundice was not present in more than 20 per cent. of the cases. Jaundice depends very largely for its presence on the location of the stone and the associated secondary changes. If the stone is caught in the direct line, *i. e.*, in the common or in the hepatic ducts, jaundice will be present, its depth depending

entirely upon the amount of occlusion caused by it. If the stone is in the biliary switch, *i. e.*, the gall-bladder and cystic duct, jaundice will not be present. There is, in the majority of cases, a slight tinge of the skin; the conjunctiva is but slightly changed. Occasionally, jaundice may be present and suddenly disappear; this may be due either to the falling back of the offender into the cystic duct from the common duct, or the stone may pass into the intestine, or find its way by process of ulceration through the duodenum or into the large intestine, or there may be a ball-valve action which is provocative of the symptom under consideration. Associated cholangitis and cholecystitis may intensify jaundice.

Adhesion with gall-stone disease causing deformity of the bile passages may be another cause; invasion of the pancreas, particularly swelling at its head, associated pancreatitis, and suddenly arising hemorrhagic pancreatitis may be associated with this symptom.

Courvoisier showed, in 187 cases of gall-stone with protracted jaundice, that contraction of the gall-bladder is suggestive of obstruction of the common duct due to gall-stone. Courvoisier's law holds further that dilated gall-bladder is associated, as a rule, with biliary obstruction due to other causes than gall-stones. The writer has found several exceptions to this rule and would not advise its full acceptance.

Nausea and vomiting are common symptoms associated with gall-stones; colic is as a rule associated with more or less vomiting and often with nausea. These symptoms vary in severity. Nausea and vomiting may persist during days after the end of the acute attack of pain, are often debilitating, and may be associated with obstipation. The writer has seen several of these cases where intestinal obstruction was suspected. The needed morphia has, by its effect, aggravated this intestinal paresis. In occasional cases, sudden copious vomiting is followed by prompt relief. In other cases vomiting aggravates the pain; the abdominal muscles during the act are tense and tender; and with associated cholecystitis or perihepatitis, or if there is an obstruction due to a gall-stone at the pylorus, the pains may be of paroxysmal character associated with paroxysmal and uncontrollable vomiting.

Hiccough is an annoying complication; it is more likely to be present with gall-stones in which the associated infectious process is deep and malignant, though it accompanies benign cases.

Loss of appetite with bad taste and foul breath are usually accompaniments of acute exacerbations of the disease. The writer has noticed a characteristic odor following within twelve to twenty-four hours after the subsidence of the pain. Certain diseases are associated with characteristic odors; the disease under consideration is one of these. It is as difficult to describe this characteristic odor as it is to describe color, unless there is something with which it can be compared.

Chills and fever associated with symptoms referable to the gall-bladder

are always suggestive of gall-stones and cholecystitis. The intermittent fever of Charcot is typical of irritation of the mucosa by the gall-stone; it is parallel with catheter fever after the introduction of the catheter, and is in all probability an expression of the infectious processes associated with the disease. The fever resembles the intermittent type of malaria. It is more likely to be present in cases in which the choledochus is obstructed. It is an interesting fact in connection with this subject that, normally, the gall-bladder and bile are sterile, and that only in the lower half of the common duct are bacteria normally found, and these mainly, the *B. coli communis*. It may be still further stated at this point that typhoid bacilli have been carried in the bile passages and in the gall-bladder during many years. Levy reports their presence during twenty years. Bile has no bactericidal properties; therefore it is easy to have infection. The febrile condition, the writer thinks, is more likely to be due to such infection than to the mechanical irritation of the stone itself.

Urine.—In the majority of cases the urine was less in quantity during the acute symptoms, was concentrated, of high specific gravity, bile-stained; and bile pigments were present. *Transitory glycosuria is not infrequent; indicanuria is the exception.* Albumin frequent.

Examination of Stools.—The color and consistence of the stool must necessarily depend upon the location of the gall-stone; if the gall-stone is in the gall-bladder or in the cystic duct the stool may not be materially changed. If, however, there is obstruction to the entrance of bile into the intestine, then there is the characteristic pasty and putty-colored stool. Most patients are constipated.

It is of great importance in gall-stone disease to examine the stools repeatedly. In many cases gall-stones are found in the stool if patient search is made and proper methods used. The writer has had cases where continuous observation covered long periods before he was rewarded with success. In one case, in connection with the vagaries of gall-stones, the diagnosis of cancer of the stomach had been made; the symptoms, however, pointed to gall-stone disease. Only after three weeks of patient search was a good-sized gall-stone found, which clinched the diagnosis. This woman after the passage of the gall-stone was relieved, made a perfect recovery, and lived over twenty-five years in good health. Not infrequently patients, who are watching their stool, come to the physician elated because they think they have found gall-stones; this is true of those who are taking olive oil. The emulsified oil leaves the rectum in small globular masses of a greenish color, which may be hard and resemble gall-stone to the inexperienced eye.

Auscultatory percussion is of great value in outlining the enlarged or dilated gall-bladder during all stages of the disease. The writer knows of no manœuvre which is more satisfactory when searching for an enlarged gall-bladder than this. It often gives information which we can

get in no other way; and if there are changed relations of the abdominal organs, if the area of stomach dullness is increased or the liver slightly enlarged, this method of examination will materially aid in reaching a safe conclusion.

Palpation.—Unfortunately, we are rarely able to palpate stones in the gall-bladder; only on one occasion was the writer able to establish the presence of stone in this way. In this case there was grating as well; but the detection of the friction of the stones rubbing against each other is very unusual.

X-Ray Examinations.—In not a single instance has the writer received material aid in the diagnosis of gall-stones from x-ray examinations. Repeated failures have not discouraged him. He insists on the examination in the hope that he may find some cases in which the stones are of sufficient density to prove the value of the Roentgen rays. Beck's favorable results do not run parallel with those of most other observers.

Besides *collapse* it is not unusual to find relative mitral insufficiency, particularly during acute exacerbation and colic. Riesmann reports 56 cases of cholelithiasis, of which 6 showed the presence of a mitral murmur. These murmurs usually disappear after the colic; and surgeons report that in the presence of cardiac dilatation and associated mitral insufficiency the removal of the stone has been followed by a return to normal conditions so far as the heart is concerned. The writer has seen patients die suddenly, in the midst of gall-stone colic, from associated and aggravated myocardial degeneration. In one case there was rupture of the fatty heart. Gall-stone disease invites degenerative changes and infections, not only in the liver, but in the cardiovascular and renal system.

In a case of gall-stones recently seen with Dr. Edward Van Duyn, we found, in the presence of acute cholecystitis and general infection following, for which Dr. Van Duyn operated, an infectious endocarditis, suddenly occurring, with not a single symptom missing. The infection ran its course; fortunately it proved to be non-malignant, and the murmurs, which were loud and distinct during its height, disappeared. The amount of permanent damage cannot be estimated until Nature's scars are formed.

Long continued gall-stones with associated infections unquestionably lay the foundation, as the writer has already hinted, of degenerative myocardial, arterial, and kidney disease. The case of one of the leading statesmen of this country, recently seen in consultation with Dr. Peck, at Utica, is an example of such general disorganizing and degenerating influences. In this case, the patient, fifty-seven years of age, went through a period of four years, beginning eight years ago with gall-stone symptoms. That there was associated infection during this time was made positive by the repeated chills and fever of the Charcot type from which he suffered. Operation was suggested but never accepted.

During the last four years of his life he had no symptoms of cholelithiasis, but *pari passu* with the original infection came the positive evidences of advancing arteriosclerosis, myocarditis, and interstitial nephritis. He died of uremia. These possibilities should be kept in mind in connection with the treatment of the disease, when recurring symptoms present clear indications.

Angina pectoris and the *dyspragia abdominalis* of Ortnier present symptoms which may be mistaken for gall-stones. In these, a study of the arterial tree and the early history, the aggravation of the attack by excitement, nervous influences and exercises with the prompt relief following the use of vasodilators, and the prophylactic effect of these with blood-pressure study will suffice to clear the diagnosis.

During the past year the writer has seen 3 cases in which the diagnosis of gall-stones was made; 2 of these in hospitals awaiting operation, in which a thorough examination made clear the diagnosis of *locomotor ataxia*, much to the chagrin of the attending surgeons. In all cases of abdominal or paroxysmal pain, no conclusions are justified, however suggestive the symptoms, without a thorough consideration of the reflexes—deep, superficial and ocular. Such study soon makes the differential diagnosis easy in the majority of cases. The writer is at present observing a case in which the differentiation is difficult. The attacks and all symptoms are those of gall-stone colic, and he hesitates making a diagnosis, because there is complete absence of the patella tendon reflexes. There is justification for attributing but little importance to the behavior of the reflexes in the case, because of the gall-bladder tenderness, the radiation of the pain, the hyperesthetic zone of Head, the tinged conjunctiva and the negative Wassermann reaction; but caution and extended observation are necessary. Such cases are not rare, and gall-bladders are and will be repeatedly opened in which the crises of tabes are responsible for the symptoms. If in doubt, insist on a Wassermann test; this will be of great help.

Renal colic, atypical, may lead to confusion in differentiation. As a rule, if the physician is present during the attack, he will find differences, even in these cases, coupled with the results of uranalysis, which will make a correct diagnosis possible. X-ray examination, the urine find, blood, pus, irregular, unevenly aggregated crystals with characteristic prolongations will place the diagnosis of kidney stone on a firm basis.

Dietl's Crises.—Paroxysms of severe pain, often with fever and some vomiting; possible collapse, arising suddenly, due to floating kidney; probably the twisting of the renal vessels may simulate cholelithiasis. Here, there is, as a rule, the neurasthenic element associated with Glénard's disease of which mobile kidney is a part, the palpable kidney as a globular mass, and the absence of characteristic radiation of pain.

Surgeons and physicians are ready to admit that not infrequently *appendicitis* and gall-stones present symptoms so nearly alike that diag-

nosis becomes almost impossible. He, who fails to recognize the fact that in acute appendicitis all sensory symptoms may be referred to the epigastrium or to the gall-bladder region, and that with gall-stones, on the other hand, all painful sensations may be referred to the region of the appendix, will make many costly errors. In the case of endocardial infections associated with gall-stones, to which reference has been made, the initial symptoms were all appendicular; at the operation that organ was found normal.

The *anomalous location of the appendix* may lead to symptoms of cholecystitis in the presence of appendicitis. Such a case, Dr. John Van Duyn and the writer had in Cortland, New York, a number of years ago, where the wife and patient both knew positively that gall-stones had been passed. There was a tumor in the normal location of the gall-bladder. We entertained no doubt of the presence of an empyema of the gall-bladder with gall-stones. On opening the abdomen, an appendicular abscess with an anomalously located appendix was found.

In considering the pains of gall-stones the writer referred to the differential diagnosis of *gastric* and *duodenal ulcer*; repetition is unnecessary. He wishes only to add that in these conditions we must study the relation of the pains to the time of the ingestion of food, the point of tenderness, the absence, with ulcer, of the Boas point and the Head zone, the presence of hematemesis and occult blood in the stools. The pain of duodenal ulcer comes on about two hours after the taking of food, and such pain precedes during a considerable period, as a rule, the sudden collapse and agony associated with perforation.

Lead colic has been mistaken for gall-stones. Lead poisoning is almost always found in men with suggestive occupations, high blood-pressure, characteristic anemia, 'blue line,' possible nephritis, tense abdominal muscles which bear pressure well; and finally the basophilic degeneration of the red blood corpuscles, shown by Wright's modification of the Jenner stain, makes the diagnosis easy.

Watch for *pancreatic* disease in all cases of gall-stones. In 95 per cent. of all individuals the common duct passes directly through the head of the pancreas (Bungener); small wonder then that this organ is so often the seat of grave disturbances. Acute and chronic or hemorrhagic pancreatitis, is, as a rule, due to infection or mechanical insult traceable to the bile passages; and some of the grave symptoms of such invasion may simulate gall-stone colic. Concretions in the pancreatic duct also simulate cholelithiasis. With pancreatic disease we look for fat stools, symptoms of peritonitis and intestinal obstruction, persistent and localized pain rather than radiation to distant parts, greater collapse,

smaller pulse, glycosuria. The Cammidge test* has been praised by some (Mayo, Robson, Maass, Kehr), while others (Dreesman, Brugsch, Hess and I. E. Schmidt) place no reliance upon it at all.

Formation of stones after operation or their removal by Nature is rare. The writer has twice seen cases in which a second operation was necessary, not because stones re-formed, but because they were not reached and removed at the first operation. In one case which he observed with the late Dr. Bull and with Dr. Jacobson, a stone formed in the hepatic duct one year after the removal of the gall-bladder, which was finally passed per rectum.

The vagaries and wanderings of gall-stones open an enormous chapter, the discussion of which would prove interminable. The writer will only refer to a few clinical experiences in abstract.

CASE I.—Female, *wt.* fifty-seven; seen in 1895. Presented with repeated gall-stone colic, ultimate tumor simulating cancer of the stomach, with symptoms persisting fifteen months, during which time the tumor was continually palpable. Complete anacidity, lactic acid present, symptoms of pyloric obstruction, disappearance of tumor followed by intestinal obstruction. Preparations had been made for operation, when an enormous gall-stone passed per rectum, unquestionably through a gall-bladder fistula, the mass palpable in its descent at various locations in the intestinal tract. Complete recovery from symptoms. The passage of a second large gall-stone eleven months after, without colic or symptoms of obstruction, followed by a perfect cure. She is to-day enjoying perfect health, at seventy-four.

CASE II.—Female, *wt.* twenty; seen in 1897 with Drs. Easton and Kellogg. An infectious cholecystitis, cholangitis and empyema of the gall-bladder, gall-stone formation, obliteration of common and cystic ducts, all following a duodenal ulcer at the ampulla of Vater; finally, operation—cholecystotomy; a second operation—choledochoduodenostomy. Complete recovery. She has had no symptoms referable to her gall-bladder or duodenum during all these years.

CASE III.—Seen with Dr. George R. Kinne, showing the vagaries and wanderings of gall-stones after ulceration through the gall-bladder, with enormous dilatations into the retroperitoneal space, the stone finally lodging in pancreatic tissue. Long continued symptoms of pancreatitis and cancer of pancreas with death following. Post-mortem revealed the state of affairs just described.

CASE IV.—Case confirmed by post-mortem of migration of a large gall-stone

*Grube and Graff: "Die Gallensteinkrankheit." Chapter entitled Cammidge Reaction of Urine in Cases of Pancreatic Disease, p. 88:—"When urine is treated with HCl and phenylhydrazine, certain crystals appear which are characteristic of pancreatic disease. *Technique.*—20 c. cm. of the clear, albumin- and sugar-free urine are mixed with 1 c. cm. HCl and heated on the sand-bath very slowly for ten minutes, then well cooled and volume made up to 20 c. cm. again with distilled water. 4 grm. lead carbonate are added to neutralize the HCl. Filter. The carbonate of lead must be added very slowly, with shaking. The filtrate is shaken up with 4 grm. tribasic lead acetate and again filtered. To remove the lead still in solution, 2 grm. of pulverized sodium sulphate are added, heated a little and filtered from the white precipitate of lead sulphate. 10 c. cm. of this filtrate are diluted with 18 c. cm. of distilled water, then add 8 grm. phenylhydrazine hydrochloride, 2 grm. sodium acetate, 1 c. cm. 50 per cent. acetic acid, heat on sand-bath ten minutes, and filter immediately, hot. Make up volume to 15 c. cm. with distilled water. When test is positive there is formed a flaky, yellow precipitate, appearing microscopically as bundles of delicate yellow needles, soluble when 30 per cent. sulphuric acid is added."

through the gall-bladder, abscess formation, finally ulceration into pelvis of right kidney. Repeated attacks of renal colic and death.

CASE V.—Repeated unrecognized attacks of gall-stone colic; incarceration of three large gall-stones in common duct; symptoms of infection; early operation refused; late operation disclosed enormous adhesions and distortion; death.

CASE VI.—Repeated attacks of gall-stone colic; symptoms of infection; tumor formation; final mural abscess over tumor, probably due to escape of small stone through short fistulous tract; protection of free peritoneum by strong connective-tissue growth, after which gall-bladder separated from abdominal wall; 601 small, hard gall-stones in gall-bladder, weighing 29 grm. (470 gr.); obliteration of cystic and common ducts, also large hepatic ducts, by productive inflammation; death.

In a number of cases of persistent jaundice due to long continued gall-stone impaction, alarming brain symptoms developed. In one of these, an old man became violently insane. The insanity yielded with the relief of the obstruction and the disappearance of the jaundice. A similar case was seen in consultation with Dr. Jacobson, where prolonged cholemia, due to obstruction of the common duct, gave rise to confusional insanity.

It is easier to recognize the results of gall-stones, acute and chronic, cholecystitis, with the host of attending symptoms, dilatation of the gall-bladder, empyema of the gall-bladder, than the primary disease itself. We cannot deny the fact that the diagnosis of gall-stones is often almost impossible, that in many cases we are justified only in strongly suspecting their presence. The writer never tells any patient that he has gall-stones; and after repeated failures in diagnosis will never again do so. He is content, and his patient must also be with the statement that gall-stones are "suspected, likely to be present." This diagnosis is what Grube and Graff, in their splendid monograph, call "probable diagnoses."

The point which, the writer thinks, we all wish to make in connection with this symposium is that for the good of the patient and for the profession, there must be concerted action of the physician and surgeon in these cases. He is thoroughly satisfied from past experiences that the surgeon will always require the physician's knowledge of pathology and diagnosis, and possibly some of his conservatism to guide him; but together they will ultimately find themselves breaking loose from extreme views to meet on vantage-ground where deliberate judgment and sound reasoning must and will prevail.

REFERENCES.

Chemistry of the Urine in Diseases of the Pancreas. (*Lancet*, March 19th, 1904.)

An Improved Method of Performing the Pancreatic Reaction in Urine. (*British Med. Journ.*, May 19th, 1906.)

DEMENTIA PRÆCOX.

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A form of mental alienation which numbers one in six of asylum population is important to the physician from mere force of numbers. Beyond this, however, the onset of dementia præcox is at times so insidious that its victim continues long in the home, and hence comes under occasional care of the general practitioner. A young person previously normal in his intelligence, in his activities and his affections, becomes indifferent, lazy, irritable, no longer amenable to home or school discipline. Formerly cheerful and companionable he now is shy, taciturn, introspective, much by himself, yet at intervals domineering, obstinate, supercilious or passes suddenly without reason from depression to gayety of spirits. His school work lags, his duties are neglected. He ceases to acquire new ideas or apply to his acts the lessons of experience. Such a change in character is apt to be attributed to perversity, bad temper, or influence of companions; but loss of appetite and flesh, insomnia, or hysteriform symptoms together with complaint of headache, vertigo and indefinite malaise usually result in a visit to the doctor to prescribe for 'nervousness.' Watchfulness on the part of the latter to note whether such symptoms mean more than lowered physical tone will obviate, in cases of dementia præcox initiated in this way, social delinquency and actual crime. The tramp criminal and roving prostitute are in no small numbers recruited from this class. Recognition will guard his patient in another direction. He will, for instance, oppose marriage as a proper sedative for the so-called hysterical girl or lazy unstable young rake, both of whom are predestined to pronounced mental reduction.* The stormy episodes which at other times usher in the attack, such as syncope, epileptiform seizures, confused excitement, a feeling of unaccountable apprehension or depression, hallucinations or, perhaps, an impulsive suicidal attempt, if limited to hours or a few days, are soon forgotten by parents and friends or are

*A young mother killed her babe by feeding it a solution of carbolic acid, and claimed to have taken a dose of the same mixture herself. With feelings that were colored by self-contempt she told of her intention to put her babe and herself out of misery, because she had been intimate with a tradesman who was the father of her child. Yet real insight concerning her act was lacking; for, in spite of an emotion displaying an ethical basis, there was entire absence of remorse or the least comprehension of her position. The writer said to her: "Don't you wish you had your baby again?" "Yes, I guess I do," she answered indifferently. Her mind was chiefly occupied with insane, hypochondriacal fears portending her death.

attributed to some extraneous cause, such as over-exertion, too much study, the heat, etc. In this way they are brought in no relation to the succeeding mental changes. Also, because important phases of mental capacity remain intact for long periods, friends either overlook for some time the mental infirmity, or, the individual's condition compared to the acute attack presents such apparent improvement as to give assurance of a speedy return to his normal state. The error of the lay mind may be the more easily comprehended in the light of medical experience, since the puzzling phenomena of this affection were not unraveled, even in part, until the present generation.

In 1871 Hecker, influenced by the instruction of Kaulbaum, first described under the term 'hebephrenia' one of the several types of early dementia now included under the group 'dementia præcox.' These were cases wherein young persons passed through periods of melancholia, mania, and confusion, following which was developed a peculiar disintegration of the mentality. Within a few years of Hecker's pronouncement, Kaulbaum formulated a related group, which, terminating in dementia, presents, as a predominating factor, a stupor in which monotonous, often-repeated and meaningless movements are enacted. This gives the appearance of a clownish automatism, since this stereotypy in word, gesture or other action has no relation to the thought continuity of which the patient is capable, or to the mood which he facially depicts. Within a more recent period two other clinical varieties have been added: (*a*) simple dementia, in which mental dilapidation is little or not at all complicated by hallucinations or automatism, and (*b*) paranoid dementia, a group in which hallucinations not only occur, but take on a more or less systematized relation to each other and to the actions of the individual. The common quality of all groups is the early appearance of a characteristic mental enfeeblement in which dementia is selective. Certain faculties are affected, others remain intact, at least for a considerable period of time, perhaps years. The individual is clear as to his surroundings; he knows time and place. His indifferent demeanor and often stupid expression do not give this impression to the beholder. The senseless harangue he may indulge in, may also belie lucidity and orientation which, nevertheless, can be established by patient and persistent inquiry. He may even, as the result of negativism (*i. e.*, pathological spirit of opposition and contrariness), say in answer to your question that he does not know, and then a little later, of his own accord, volunteer the correct answer. One way in which negativism is displayed occurs in conversation and is worthy of special mention. The English term 'irrelevancy' describes one; the German *vorbeireden* (literally, speaking beside), another phase of its exhibition. Herein the patient gives a frivolous, inappropriate reply or just eludes your question in his answer. A precocious dement who attempted suicide, was asked: "Did you throw yourself before the car?" A. "I do not remember being run over." Q.

"But did you throw yourself in front of the car?" A. "There are easier ways of killing oneself." Q. "Do people talk about you?" A. "You have a better chance to know." Q. "Have you been in an asylum before?" A. "I suppose this is another Michael of a medical college." The constant antagonism of uncontrolled reflex impulses may lead to the simultaneous display, in the same patient, of suggestion or command automatism, side by side, with symptoms of negativism—namely, while answering always in a spirit of contradiction, he may, nevertheless, assume attitudes on command, or retain an uncomfortable position if placed in it, or accomplish a series of acts, such as eating a meal after initiatory opposition, when once seated at the table.

It has been said that stable and correct concepts of time and place are held; yet, beside these, many delusional percepts occur. The precocious dement will hail an individual near him as an intimate friend; but, since the impression is but momentary, he will doubt or deny his words immediately thereafter. Failing also in relational comprehension of his environment, he develops a feeling of unreality concerning it. Referring to others in the ward, a patient said to the writer: "They are artificial." "They look real as they walk about," was the rejoinder. With another survey of the ward, she replied: "Yes, but they are made of wood."

Memory in comparison with some of the other faculties is not much involved. Recent events, too, if for any reason impressed on the patient, are remembered; but since he lacks interest to observe, or observing, is unable to concentrate his attention, his store of recent facts are few. Sometimes a patient who seems completely at a loss to answer some simple questions, amazes one by an observation showing considerable acuteness of perception regarding a subject entirely irrelevant at the moment. This is an index of his manner of cerebration. With practically no mental fixation, or voluntary association and comparison of ideas, a thought cannot be logically developed, but mental automatic action is exaggerated. His speech results from completed mental reflexes. A belated reflex may at times be recognized in an appropriate answer to question one, when the inquiry has advanced to question five or six. His statements have little appearance of choice; and, if these reflexes follow one another rapidly, speech may become, to the last degree, incoherent. For instance, a young dental student on entering the room, takes a pose to show his profile, and, of his own accord, begins "hold head to one side, you have preserve, paraffin, venous and arterial circulation, ex-sultan of Turkey scoffed at, gets along if he smokes his pipe, no more respect for mercury student than Venus student, Japanese gentleman, ruler of the world, etc." At times the precocious dement, no longer limiting himself to senseless phrases, invents words of sounding cadence. "Hurley fonz non silician," was the favorite salutation of one dement who claimed to utter herein greeting in a universal language. Sometimes gibberish will be spoken or written in metre, in which case the product will be not unlike that of some

modern nonsense poetasters. One may recall in this respect Lewis Carroll's effort in "The Hunting of the Snark."

Affectivity is greatly involved. Early in the disease the patient is depressed, has apprehensive moods; his fears, perhaps, leading to great excitement. He may cry out, run away, or commit some untoward act. More rarely he is boisterous, or laughs much, or busies himself with many things always ineffectually. After this initiatory and passing phase he displays great indifference, no longer cares for family or friends, loses interest in his work, exhibits neither joy nor sorrow, expresses no desires, makes no complaint. No matter what is done to him he evinces no surprise. If threatened, he offers no protest nor makes a movement of defense. At times, however, this chronic state of indifference is interrupted by periods of irritability, anger, anxiety or restlessness occasioned and subsiding without apparent cause.

Judgment is invariably affected. In simple actions and manner of life which have become habitual, the patient makes no gross errors, but is unable to assimilate and draw conclusions from any new experience. For the same reason he has no real conception of his condition, although a vague consciousness of a change in himself and the relation to his environment may be expressed, and at times noted, during quiet periods, in a facial aspect of dull confused inquiry.

In acute and subacute cases hallucinations are practically always present. Early in the disease they are of a depressing character: hypochondriacal, self-accusatory of wrong-doing, persecutory. As dementia progresses, ideas of grandeur are associated; or, from the beginning, highly imaginative, romantic, silly, or phantastic ideas may predominate. Often there is a lack of harmony between the character of the delusion and the facial expression. A story of horror, persecution or melancholic despair may be related with a smiling expression or one completely apathetic.

Many somatic disorders occur during the course of the disease. None of these, however, is pathognomonic, as are some in paralytic dementia. Attacks of syncope are frequent; convulsive, hysteriform, epileptiform and apoplectiform seizures occur, the latter followed by paralyses which may last for some time. Also, choreiform movements, tics resulting in grimaces, habit coughs, snuffling and lasting cramp-like contortions as, for instance, pointing the lips like a snout, are some of the anomalies noted.

Anesthesia, noticeably to pain, often exists, but one must be on guard against misinterpreting. It must be understood in this respect, that whereas normal defensive action is the result of conscious choice, absence of normal will results in impulsive, automatic, unseasonable action or like restraint.

Tendon reflexes may be diminished, abolished, or exaggerated, the last being the rule. Pupillary reactions are often disturbed, such as sluggish

action, inequality, mydriasis; but entire loss of reflexes or an Argyll-Robertson pupil will not be observed. Vasomotor disturbances, such as localized edema, cyanosis, continuous sweating, brady- or tachycardia are frequent. Insomnia, loss of appetite, indigestion and constipation point to disturbed metabolism. Significant, in this respect, is the not uncommon enlarged thyroid.

The foregoing comprehends an outline of general characteristics. Difference in clinical pictures make possible the grouping of these cases under several heads; but since transition forms are many, it must be understood that absolute distinction cannot be strictly maintained.

Group I.—*Simple Dementia*. The onset is insidious. Hallucinations appear to play no part in the course of the progressive dementia. The following case history is offered in illustration.

M. T., *æt.* twenty. Did well in school until about fourteen years of age. Previously industrious, she became lazy, impudent, assumed airs of superiority and was uncontrollable. As the father had deserted the family and the mother worked by the day, the patient passed her time as she pleased. After months, during which she lay abed most of the day, she announced her intention of studying music and of fitting herself for the position of high-school teacher. She matriculated at a local normal school, was feverishly active for several weeks, but made no progress whatever. After this she spent much of her time on the streets. She took a place as a house-maid, but was soon discharged. She then disappeared for several months, when the mother learned from a son living in California that in some way the patient had made her way there. Several months later, the patient again appeared in Denver. She was pregnant, and in due time was delivered of a child. At the hospital the patient took no interest in anything, would lie abed the entire day if permitted; occasionally appeared frightened and was found hiding under one of the beds; could not always find her room. She understood simple questions as to time and place, and uniformly answered: "I don't know, I am sure," but if pressed to do so answered with fair correctness. She was less successful with figures, said " $6 \times 2 = 12$; $9 \times 2 = 16$; $10 \times 7 = 26$;" could not subtract 19 from 25. She was quiet, looked about aimlessly; often smiled to herself, but could give no reason for this. Taken into court, she lost her indifferent mood and despite a childish manner, answered the simple questions put to her appropriately enough to make the judge doubt the propriety of a lunacy inquiry. He called the writer aside and asked if he was certain the defendant should be adjudged. The writer related her history in detail and pointed to her vagabondage and pregnancy as evidence that she could not care for herself. The inquiry was postponed and the patient returned to the hospital. The next day she appeared unusually stuporous; but, being pressed to explain the meaning of the previous night's proceedings, finally blurted out "a witness scene." Five months later the patient was again brought into court. She made no attempt to answer questions, merely stared vacantly ahead and was speedily adjudged insane. Early recognition of the disease in this instance would have prevented an insane mother giving birth to an illegitimate child.

Group II.—*Hebephrenia*. In most cases in this group hallucinations are many and dominate the consciousness of the patient. Often, too, the disease is ushered in by a distinct episode. Thus one patient ran away from the farm in great apprehension because he knew he was to be

hanged and his family were to be hanged; could see the gallows. The only reason he could give for this penalty was that he was lousy, a statement which in itself was fiction. Another patient, during great press of work in a laundry, began to rush about aimlessly, shrieking and striking at objects in her path. After this acute attack of confusion and delirium, lasting several days, she became quiet, but could no longer do her tasks; she was silent; would leave her work, go into the engine-room and stand beside the dynamo looking at it intently. Occasionally she made odd, barking noises. At the hospital she said: "I struck out because the girls jumped on me." When pressed to answer she knew time and place and could count so as to make change. She was silent, yet restless, always walking about the ward with a dazed, inquiring expression.

In another case, a young woman of twenty-six years was said to have been well up to two and a half years previously, at which time she had "some mastoid trouble," and about the same time was jilted by her sweetheart. Was always a nervous girl inclined to overtax herself in her work, that of a stenographer. She became despondent, sleepless, talked much to herself, but continued at her work. One day, of a sudden, she began to cry out and became confused as to her surroundings. At the hospital she talked incoherently, with the press of mental images following each other so rapidly that, although she answered the question put, the reply was crowded by illusions suggested by her surroundings; mistook nurses and doctors for intimate friends, laughed, sang, destroyed her clothing. This condition, with occasional remission as to degree of excitement, lasted for some months, during which time she pulled out almost every hair in her head. Profound, mute and motionless dementia supervened within fifteen months.

A young man attracted attention to himself by breaking a window at 11 p. m., to enter the house of a young woman for the purpose of proposing marriage. Brought into the hospital he was restless and incoherent. The writer asked: "Are you sick?" He answered: "Not sick; here because they recognize my ability; try to make it Paradise; my college is Judea; it is Passover; your God owns this place; these people have sinned; my fault; my thoughts control the world." The writer broke in with insistent questions as to date, month, year, and character of the place he was in. These were answered correctly. The patient then continued: "Evil thoughts balanced by my head thrown back; can chase my name round the world; can put anything on the wall; father seems to be on the woman's side. When I think, everyone thinks, on the umbrella stem; took your picture looking at you, etc." After several weeks the boy became quiet and, as regards hospital discipline, quite amenable, but he had no real insight into his condition and explained his conduct on the ground of "nervousness." His relatives asked for his release, saying they wished to send him to a lower altitude. He was permitted to leave, but was returned to the hospital within twenty-four hours. Once beyond institutional discipline, he was wilful, suspicious, domineering, irritable, and, if the least restraint to his desires was interposed, he threatened violence. Clear as to his environment and with the semblance of reason, such an individual is sufficiently demented even during quiet periods to preclude an independent existence.*

*We observe in this group the elemental factors of depression and mania, following which dementia, to a greater or less degree, supervenes—the symptomatic association which Hecker originally described as hebephrenia. To-day the manic-depressive syndrome, representing a clinical entity, comprehends the ideas

Group III.—*Catatonia*. In the consideration of symptoms common to several recognized types of this affection, mention was made of perversion of the will resulting in automatic action or like inhibition. We recall that tendency to such automatism is frequently present in any case, viz., the imperative and irrelevant hallucination; the crowding mental pictures that impel instant and incoherent speech; the negativism that is silent to the urgent question, yet permitting a correct answer shortly thereafter; the irrelevant reply; smiling without appropriate emotion; impulsive, purposeless flight; the attempt at suicide without reason or explanation, etc. However, in catatonic cases associated with usual depression, hallucinatory excitement, incoherence, and particularly stupor, automatic action dominates the clinical picture. In one case the history recorded a four month's somnambulistic sleep. Two years later, following a slight trauma, the patient passed into a like state, in which he muttered stereotyped phrases and ate and drank when fed. He was gradually brought out from this stupor by cool, full baths which he resisted with violence. Once awake, he was mute for more than four months, simulated deafness, appeared depressed, yet helped about the ward. With returning speech the now loquacious patient developed an expansive delirium with most absurd ideas of grandeur.

Another case is a man of twenty-seven. When admitted to the hospital he appeared agitated and continually muttered to himself. His manner of looking about and the occasional single admonition, such as "stop" or "I will not" in a loud voice, suggested the presence of hallucinations. He fell on his knees, placed his hands in the attitude of prayer, called "God, God", then spelled out the word. He paid no attention to questions. For about ten days he lay in bed motionless except that occasionally he muttered to himself; sometimes it was necessary to feed him by tube. Later, when out of bed, he paced up and down the ward, and about every ten feet walked in a small circle, then continued in the original direction. Still later, he was found daily near a certain door, standing for hours on one leg, stork-like, or on the floor, kneeling, silent and motionless with his head thrust so far forward that it was hard to understand how he could keep his body from falling. His face was expressionless, and as set as that of a wax figure.

The uncomfortable attitudes which these patients assume for hours or keep, if placed in them, is explained by hypertonicity of the muscles; and the cramp-like condition in which the individual can be attitudinized like a manikin is called 'waxy flexibility.' These peculiarities of conduct are not dependent upon delusions, as a rule; although, as in this case, delusions may have initiated them.

Impulsive acts, persistence of certain grimaces or other motor effect, of congenital tendency, alternating depressive and maniacal periods which, if followed by recovery, are attended by no marked mental deterioration after the attack, and, a like recurrence of the cycle if the patient's life is sufficiently prolonged. Nevertheless, cases of manic-depressive insanity occur, following which some mental reduction has taken place, and here a careful history may elicit information that, antedating a previous attack, the patient was brighter than he later appeared to be. These border-line cases make it altogether likely that a manic-depressive dementia præcox will come to be recognized.

or inhibition of normal stimuli to motion, may occur during catatonic excitement, the patient appearing confused or maniacal, or, may be associated with so-called catatonic stupor of varied degree of intensity. One morning the writer offered his hand to a precocious dement whom he noticed standing motionless for some time. One of the attendants offered a word of caution, the patient having been noisy during the night and having struck another patient that morning. However, he answered in whining tone and in monosyllables to a few ordinary questions. The writer turned aside, and in that instant this stuporous individual had thrust his fist through a nearby window-pane. Before and after this movement his face was expressionless.

Stupor in these cases represents no profound disorder of consciousness—apathetic expression and immobility arising in disorder of the will. Following an attack of stupor during which he may appear to be leading a mere vegetative existence, the precocious dement is apt to relate many facts that occurred within his range of vision. Also, since impressions of the outside world may be recorded but not reacted to, he will, during the same time, make no effort to protect himself against either threatened or inflicted injury. A record of these peculiarities of action or its inhibition could be lengthened indefinitely. Enough has been presented to give a fair idea of the catatonic element which dominates the clinical picture in one group of dementia præcox.

Group IV.—*Paranoid Dementia*. Isolated reaction to hallucination, or other insane idea, often occurs early in dementia præcox; but anything like systematized delirium with continuity of reaction is met with as a late development of the case, or, if it seems the initiatory phase, abnormal character and eccentricities will have long been previously noted. Thus the patient cited, who fled from home because he feared he and his family would be hanged, and one who fled from the beet fields because of voices which taunted him regarding his work, displayed the depression of acute hebephrenia. Neither one further elaborated his insane idea nor reacted beyond his first move. On the other hand, the patient, some of whose catatonic symptoms have been related, viz., stereotyped mutterings and the taking of food during prolonged somnambulistic stupor, months' long mutism, etc., displayed paranoid delusions in the subsequent exalted period. Admitting he had a wife, he was nevertheless constantly engaged with arrangements for his forthcoming marriage. He regretted that, having promised the position of Surgeon-General to the resident physician, he could only offer the writer the Collectorship of the Port of New York. His manner was affected, ceremonious, over-polite; his humor exalted, yet irritable. He indulged in the most absurd attire and decorations, and adorned his fingers, ring-fashion, with the yellow draw-strings from pouches of smoking tobacco. While ceaselessly employed, his aims were unstable, and associated delusions were constantly metamorphosed. Yet the content of his insane ideas had to do with two persist-

ing qualities—namely, erotism and unlimited power. One day he was about to marry one woman, perhaps three the next; recognized the head nurse as a professor on one occasion and later as a great divine; himself at one time President of the World, at another, acting as the personal representative of the Lord, etc. The precocious dement acts out his delirium. Existing insane ideas immediately depend upon hallucinations or imperative ideas appearing in consciousness, and not upon characteristic paranoid reasoning from delusional premises. For this reason, the paranoid ideas of the precocious dement are not always convincing to the individual himself. He may deny his statment the next moment or, half believing it, attempt to pass it off as a joke, or change his expressed opinion in deference to unbelief voiced by his auditor. At times, this produces the effect of simulation; but continued observance will demonstrate that we have to do with constantly repeated imperative ideas—another effect of automatism.

Another dement presenting paranoid ideas was E. S., *æt.* thirty-six. No previous history obtainable beyond the statement that the patient had been depressed for some time and had complained of being sick and of having pain. She had visited several neighbors to tell her mind regarding alleged persecution, and had made threats. In the hospital she said she was placed there because she could not get along with her folks—the neighbors did not let her have free will—they did not take her along—they seemed to be “going a good deal.” She could hear people talking about her through the telephone in the neighbors’ houses. Dr. X. was in control of her mind—neighbors blamed her because she hadn’t things to loan them—her mother came to her at night in spirit, etc. She knew she was in a hospital, but missed the date by seventeen days. Taken into court she was released after a jury trial. In the writer’s service, one year later, he again found the patient in the insane ward at the County Hospital. She had forgotten her delusions regarding her neighbors, and the voices in the telephone. She felt herself hypnotized by a patient, naming her. In an apathetic manner she repeatedly spoke of seeing corpses on the floor, but beyond the mere statement one could gain nothing. Dementia had become profound.

In contradistinction to the foregoing, in which paranoid ideas supervened upon symptoms of earlier phases of dementia præcox, the following case represents another characteristic method of development—an example of so-called original paranoia. In this state mental abnormalities appear from early youth. Physical stigmata, too, are apt to be present. The individual as a child is different from his fellows. His queer ways mark him and often gain him a nickname significant of them. This is long before insane ideas are expressed. Often these children are regarded as precocious; they are usually so sexually. They appear to be interested in subjects discussed by their elders; pore over technical works. They are quiet, retiring, have formal manners, are little inclined to engage in sports suitable to their age, but are much given to day dreams. At puberty, their peculiarities are apt to become intensified, and as they advance to adolescence show their lack of character by shirking all responsibility and by lack of initiative. They display a fearful and shifting disposition and an uncertain and irritable temper. Their credulity is

easily imposed upon; lack of shrewdness and inability of taking in situations mark them for failures in the ordinary business of life, if they attempt to act without supervision. They generally attract attention to themselves and their insanity in early manhood. Here a preliminary hypochondriasis or mental depression is no essential. The ultimate degree of dementia in this more strictly degenerative form is less profound than where paranoid delusions are engrafted upon acute hebephrenic symptoms following a normal childhood. The following case exemplifies this type.

P. S., *æt.* twenty-six. Right side of face less developed than the left. His brother states the patient has had measles and typhoid fever. As a boy he was sullen and obstinate, yet shy in the presence of strangers. He did not care to mingle with others at play. Was continually made the butt of practical jokes amongst boys of his age; was at all times noticeably pessimistic. In school he was backward in his work. Patient himself said his teachers disliked him and suspected him of stealing, so he wrote parodies on them. Admits masturbation as a habit. Leaving school he took several positions, but held none for any length of time. While in the hills, working as a miner, the thought came to him to take up journalism. He added: "An article which I wrote was taken by some one as pointing to me as a criminal. I wrote six plays and sent them to an actor. He sent them back saying they had much merit. One of the characters was a reporter for the *Denver Post*. The *Post* began to poke fun at me. I read this between the lines. When in the Christian Science church, I was speaking to a friend when I noticed a woman come in that reminded me of a character in Dickens. When she left, all I did was to ask her which way she was going. The next day everybody was looking at me and people were following me. I knew this by the sound of the footsteps. One day a woman asked the direction. She was sent by the Chief of Police. I was suspected of being the man who killed the people on Capitol Hill, etc." The patient had many other insane ideas and also auditory and visual hallucinations regarding crimes at that time detailed in the public prints. Shortly before he was brought to the hospital, he wrote to a number of well-known people protesting against unjust suspicions connecting him with various crimes, and at the same time offering to give information that would bring the real criminals to justice. He also mentioned that his mission was to be the "world reformer." At the hospital he went about with pencil and pad; stated he was writing a history of the world that would be translated into all languages. He was sent to the State asylum and remained there two years. Since then, for about the same length of time, he has been employed on a chicken ranch. His duties are well done and he works with tremendous energy. He mutters to himself a great deal, and at times is noticeably restless and uneasy. Then he is apt to speak of his delusions. As an instance, he recently told his brother that certain royalties on a play now on the boards were unjustly being withheld from him. Ridicule of his pretensions, threats of bodily punishment, and a return to the asylum if he should attempt to put pen to paper, have thus far put a quietus on these outcropping ideas. When thus intimidated he makes a joke of his words, perhaps says: "Oh, I know I am cracked," laughs and walks away. But the next day or week, a like notion must needs be expressed. Mental capacity does not seem to have noticeably deteriorated during the past four years.

Etiology.—Heredity is a factor of greatest importance, various observers noting its presence in 60 to 75 per cent. of cases. However, this

refers not only to dementia præcox, but also to other psychoses in the ancestors. Severe infections, over-exertion, great mental stress, traumatism and subjection to operation are some of the conditions found in histories of this affection. One can only regard these facts as predisposing causes. That the exciting cause is an auto-intoxication is the view accepted by most observers, and is apparently supported by some, although as yet, meagre pathological findings. Because he noted frequent development of dementia præcox at puberty, associated with menstrual disturbances during pregnancy, or the puerperium, and at the climacteric,* Kræpelin suggests a possible relation of such intoxication to processes within the genital organs. There are reasons, however, why one should not limit the hypothesis to the effect of internal secretions from genital glands. Effects upon mentality of abnormal function in the thyroid, hypophysis, and thymus must be considered in this respect.

Pathology.—Alzheimer found in one case of catatonia, in which death occurred in acute delirium, changes in the cortical cells, more especially in those of the deeper layers. The nuclei were greatly enlarged with folded, distorted enveloping membrane. Cell-bodies were atrophied, tending to disintegration. Associated was pathological increase of glia fibres. Like changes were noted in the basal ganglia. Nissl, Vogt, and in this country, Dunton, confirm these findings in cases of dementia præcox. The thickness of the cortex as a whole appears unaltered. Alzheimer claims that the degree of cortical metamorphosis is in a measure proportionate to severity of clinical symptoms.**

Prognosis.—In general this is bad. Dementia in varying degree is the usual outcome. Recovery is attributed to about 8 per cent. of cases, but the plane of society to which some of these cases return is apt to overlook slight loss of mental concentration, of insight, judgment, inability to grasp details, etc. The patient referred to, who broke the window-pane, had a history of an attack seven years before with complete recovery.

*The very early cases, which cannot properly be termed hebephrenia (puberty insanity), and the late ones, regarding which precocious dementia is an evident misnomer, must lead to separate classification of these types or a new term having no reference to age. 'Dementia paratonita progressiva' has been suggested. Having reference to the hypertonicity of the muscular system, this term is not applicable in all cases. The writer suggests 'selective dementia' with modifying prefix—juvenile, simple, hebephrenic, catatonic, paranoid.

**Significant in the light of the above findings is the glial overgrowth which exists in insular sclerosis. Two almost identical cases have come under the writer's notice in which young women passed from health to total dementia and an absolute vegetative existence within two years. The early symptoms were those of multiple sclerosis and some loss of mental capacity, chiefly noticeable in general lack of interest and indifference to personal appearance, neatness in dress, etc. In each case occurred a series of syncopal attacks, weeks or months apart, always followed by delirium or coma. With recovery from these attacks, a further loss of mentality was invariably noticed; also greater difficulty in walking and in the use of the arms; additional speech impairment until total inability to accomplish vocal sound supervened. In one case initiatory changes began after diphtheria.

It is not uncommon for the 'recovered' to suffer a relapse.* A frequent result is 'recovery with defect.' Here the patient is still capable of leading an independent existence, but noticeable damage to intellectual and ethical development requires him to take a place in society far below the plane to which his original endowments would have entitled him. At times, recovery finds the intellectual faculties are reasonably well maintained, but the moral ones blunted. Other terminal conditions are simple dementia in varying degree or dementia associated with extravagant, silly, phantastic or weird hallucinations and delusions.

Treatment.—The cause of dementia præcox being obscure, treatment is purely symptomatic. The acute cases, or those of slower development presenting marked anomalies of conduct, will obviously be undertaken in hospitals for the insane. This will follow established lines to sustain and improve systemic metabolism, and, according to the indication of symptoms, to allay excitement, combat insomnia, forcibly feed the stuporous, prevent suicidal attempts or other injuries, etc. If sufficient improvement has taken place, out-of-door manual labor suitable to the strength of the patient is to be recommended. The colony system, which has been inaugurated in this country for epileptics and congenital defectives, should be extended to include other forms of mental alienation. Of such colonies, the precocious demented would be the greatest beneficiaries, for, as many are long lived, they represent the largest contingent of old cases in almshouses and asylums.

The main object of this paper, however, was not to follow the destiny of fully developed cases. While a more or less complete clinical picture has been given, presentation of detail especially purposed to portray those early symptoms—hypochondriacal, neurasthenic, hysterical, and such slight mental changes, intellectual and ethical, that together make up the first scene of a grave disorder. By advice of the general practitioner, prophylaxis of the greatest moment to the patient and his environment may be inaugurated, inasmuch as institutional care would guard against those impulsive attempts at self-destruction which frequently effect the first realization that a serious condition presents; would prevent criminal acts directed against person and property, such as arson and criminal assault; would lead to protective segregation of social delinquents of both sexes, with all that this means to society at large. On the other hand, proper institutional regime for these unfortunates, most of whom are incapable of leading an independent existence, not only tends to preserve the intellectual residue, but furnishes a measure of happiness to those who retain some mental capacity, in affording them means to labor within range of accomplishment and without the stress of livelihood competition.

*Short remissions are sometimes amazing in character. Thirty-six hours before the trial of the dental student previously referred to, he suddenly cleared up to such an extent that an inquiry in lunacy seemed an incorrect procedure. He was composed, gave clear details of his history, and appeared to have some insight into his condition. Nevertheless, his trial having been set, he was taken into court, by which time he had relapsed completely. Such clinical experience gives color to the theory of auto-intoxication as the exciting cause of this affection.

A STUDY OF ABNORMAL MENTAL STATES IN NORMAL INDIVIDUALS.*

By SIDNEY I. SCHWAB, M. D., of St. Louis.

In this paper an attempt will be made to correlate some of the phenomena commonly met with in the insane with similar phenomena appearing in those who are held to be sane. The study of these symptoms are sure to throw light on their genesis and will help to determine just what connection there is between them and the total problem implied by the term 'insanity.'

I am aware of the great difficulty involved in this task, particularly with that part of it which relates to the question of connecting up the symptoms occurring as, perhaps, isolated phenomena in normal individuals with the full-blown dramatic and incisive picture of an individual to whom the term 'insane' may be applied. I am likewise aware that some believe that no relationship exists between such isolated phenomena and insanity, as a clinical expression and considered as a pure clinical type, yet the analogy is too close to allow of so dogmatic a dismissal; whatever degree of controversy may be admitted to exist, this much is fairly certain: The mental mechanisms involved in the one case are essentially those that are at work in the other, and whatever the sum total of results may show, the units are essentially the same. As ignorant as we may be concerning the underlying laws of mental activity, the resultants are open to analysis. We may be certain of one thing, at least, and that is, that between the sane period and insane period in the same individual there is no conceivable important alteration in the essential factors of consciousness; that is, in the mechanism concerned in the production of consciousness, if the term may be here permitted.

The questions most intimately stimulating the activity of the specialist are the fascinating problems concerning classification, etiology, therapy and other matters largely technical, and for that reason devoid of larger interest. Beyond this we enter into the realm where technical considerations lose their positive value, where we are to face the question in its broader presentation, which has to do with the problems concerned directly, or indirectly, with the mind that has become disordered. It seems to me, in thinking about this matter, that the way of preparation most logical and useful would be laid along the lines of a somewhat intimate,

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though non-technical, study of a mind which we label normal, to see if it is possible that this kind of a mind belonging to an average individual has contained, within its normal limits, evidence of a certain degree of mental unsoundness, shown by the presence of primitive symptoms which are found necessarily in the insane; to see if such symptoms in the normal have the same sense of strangeness, aloofness, and that sense of foreignness which isolates the insane from his normal brother.

The technical consideration of the limits of the insane from the sane leaves a fairly large region that is debatable and varies largely with the individual investigator. That this territory has its representatives in the lives of individuals for whom no positive inquiry in regard to their sanity is ever put into action, or, perhaps, ever thought of, is not so commonly known, yet a careful study of apparently normal individuals will show with rather startling frequency periods during which emotional instability closely approaches that of a manic-depressive state, and, again, where actions and thoughts are so largely controlled and directed by delusional beliefs that the designation of a paranoid would scarcely be disputed. That we call such things moodiness, or prejudices, need not disturb their inherent relationship to mental abnormality.

Our general data and criticisms that conduct, or personality—the former out of harmony with the environment, the latter as partially or totally changed—are the undisputed evidences for a diagnosis of insanity, need scarcely be regarded as invalidating the notion above expressed; for often both exist, and with so marked a degree of variation that the subject by this standard of measurement is indeed to be considered insane.

For some years I have been interested in studying what Freud for other purposes has designated the psychology of every-day life—*das alltags Psychologie*—in people who came under my care for various conditions other than psychic, and in people at large with whom a more or less intimate acquaintance furnished the data for some of the opinions that are here advanced. I have felt that some statement might be of interest, even though its presentation might be rather difficult. As a temporary classification, this is submitted for consideration: (a) Abnormal sensory phenomena; (b) delusional states; (c) emotional complexes; (d) temporary mental incapacity; (e) disturbances of conduct; (f) changes in personality; (g) social delinquencies.

No attempt at presenting clinical histories, or data, will be made here, but it is desirable to call attention to some curious phases of sensory abnormality met with, and very frequently met with, in individuals who are otherwise normal. In experience with the material in the observation wards of our municipal hospital, the writer has been frequently struck with the common occurrence of a symptom, or a complex, that may be described as that of temporary loss of the knowledge of self. The patient, often confused, and, perhaps, slightly disoriented,

complains that he feels a sense of strangeness, of foreignness to himself; there is a lack of awareness and a kind of hypasthesia of consciousness, as it were.

This curious phenomenon is of frequent occurrence in perfectly normal individuals, and particularly frequent among such individuals to whom the term 'psychasthenics' has been given.

The point to be made here is not its explanation, or its psychological groundwork, but merely to advance the query of the relation between such a state in its effect upon conduct in a case of manic-depressive insanity, let us say, and conduct in an individual for whose curious acts no reasonable explanation is apparent. The normal individual says frankly that he was not himself when such and such a thing has been done, or such thoughts advanced, or such and such an attitude taken. With this statement we are apt to be satisfied, or must be, whereas in the other case the act in its relation to the state of strangeness to self becomes a symptom-complex, wherein diagnostic features of importance are implied. Are we to assume simply a quantitative difference, or is there something distinctly changed in the quality between unawareness of self as contrasted in the sane and the insane?

In studying a number of cases belonging to the dementia-præcox group, one is impressed, I believe, first of all by a sense of strangeness, of aloofness, which the outward appearance of the patient rouses. We see them as figure-heads, behind which the springs of their personality play their complicated parts, giving only a momentary glimpse of themselves here and there through facial expression totally disconnected with the deeper activities. This out-of-touch attitude of the præcox, the shut-in personality of Myer, has its counterpart in the normal in states of abstraction and so-called deep contemplation.

Leaving out of the question the content of consciousness in both instances, of which we must be totally ignorant, is it possible, for instance, to obtain a closer understanding of the objective phenomena by a study of the normal individual when he is in such a condition of temporary environmental aloofness? May not the same laws underlie the one as the other? May it not be possible that the grimacing, frowning, curious elusive facial contractions of the præcox be but the variation, at slow speed, as it were, of the same outward expressions of the individual so deeply concerned with himself that his reactions are no longer changed, or measured, by the sense that he is a part of an environmental scheme?

I approach the subject of delusion with considerable timidity, for here it is agreed that they are met with in both those who are sane and those who are not. Delusions are false beliefs. The false beliefs of the paranoid, or depressed, are said to be distinguishable from those of the normal by virtue of their absurdity, fixation, lack of harmony with environment, lack of influence by argument, etc. I have,

as have many of you, no doubt, tested delusions by these and other measurements, and found that the two were not to be separated at all, nor is conduct, as a result of the delusions in which conduct finds expression, any more certain a test. I have examined frequently side by side the delusions of the sane and the insane, tested them by every criterion that I could lay my hands on, and have found no essential difference. I am, naturally, not studying the absurd and bizarre delusions of the paretic, showing obviously a product of a weakened and breaking intellect, but purely the delusions of the paranoid of depressed states. The frequency of persecution delusions in normal individuals is too freely admitted to necessitate the proof that they exist, and I have found, as have many others, all the essentials of an exquisite paranoid delusional system originate, develop and disappear in the course of a few weeks in people who are altogether sane and respectable citizens. Test and weigh them as you will, the isolated occurrences of such mental phenomena differ in no degree from the permanent and frequent occurrences in cases of paranoia, that is, before the intelligence has become warped and out of tune with the social surroundings.

Distinction may, perhaps, be found in the gripping quality and in the introspective disproportion rather than in the innate quality of the belief itself. But even such an attempt at explanation leaves us unsatisfied and suggests that there is a field of intimate psychical relationship which has been as yet scarcely studied, where lies the distinction, if it exists at all.

It is not necessary before this audience to dwell upon the important rôle played in history by the paranoid type of mind, the essential quality, perhaps, of which is an absolute belief in itself and a total disbelief in the efficiency of opposition to itself. This magnification of the ego is so commonly attributed to many successful men that one is inclined to believe the success is, perhaps, not unrelated to a comfortable degree of insanity.

Disturbances in emotional balance are naturally so frequently a phase of our normal existence that little attention is given to them outside of such criticism as may be directed to the unfortunate depressed, or highly exalted individual, whose mood happens to go a bit beyond the conventional requirements.

In passing, it might be pointed out that such variations in temperamental reactions are of themselves indicative of just that kind of instability which forms the prevailing characteristic symptoms of manic-depressive insanity. I am particularly interested, however, in the consideration of that more desperate degree of depression found occasionally in the normal individual, as a result of which two elements are found which are considered pathological when the mentality of an individual is under serious investigation. I refer to the development of abnormal sensitiveness, and upon that the birth of a definite persecution delusion and of a self-accusatory element leading so fre-

quently to the thought, planning and carrying out of self-destruction. Back of all this should be emphasized the fact that the emotional tone of the individual's whole content of his consciousness is morbid melancholy and depression. In the study of a number of individuals who have not made a success of their lives, and whose temperamental peculiarities must be considered as bound up with their failure, it is easy to see how closely allied to pathological mental states their mental make-up becomes. The positive inability of a certain type of individual to square his mood to the actual necessities of his life often leads to such a degree of introspective inquiry as to lay the foundation of that ego-centric contemplation which forms a beginning of a series of morbid states, upon the basis of which develop phases of distinct depression. As far as can be determined, they are distinctly pathological in type if viewed from the standpoint of the clinical picture presented by a manic-depressive psychosis.

Assume a certain degree of business, or professional failure, or even a lack of a distinct success, social disappointment, deceiving friendships, etc., and there follows frequently a depressive state, upon which is further elaborated, after constant repetition, or succession of experiences of the same kind, the morbid state referred to above. Such individuals, in endeavoring to find some adequate explanation of their lack of success, become rapidly to believe that there is something external and outside of their own influence which lies at the foundation of their failure. They thus become peculiarly sensitive to references to their own affairs, scenting readily criticisms of themselves in remarks that are made with most innocent intentions; in other words, they develop ideas of references in just the same way as they are presented in typical cases of paranoid delusions. It can easily be seen how rapidly and how easily there develops on such a basis a miniature picture of a systematized delusional structure which contains all the essential features that are seen in well-recognized psychoses.

One of the peculiarities of such individuals is a slowly developing increase in self-importance, hidden, however, frequently from superficial observation by the tendency towards self-effacement. If we study the paranoid individual in certain phases of his development, we will find a very similar state of affairs. The loneliness of the paranoiac depends upon, I fancy, the sense of his unusualness and of superior isolation. The type of individual that is referred to here shows exactly the same marks and reacts towards society in exactly a similar fashion.

If time permitted, it would be possible to analyze further cases of this kind, and there are a number of instances in my own experience in which an individual has gone through practically all the phases of a delusion of persecution whose basis depended upon a series of acute disappointments. That in time the delusions disappeared and the patient became his normal self again, perhaps distinguishes clinically this from

the purely insane type; but the point that is here to be made and accentuated is that the individual, caught in the meshes of the delusional system as outlined, would scarcely in any sense become the subject of inquiry as to his sanity, largely for the reason that to those about him and among those with whom he comes in contact, the causes were found sufficiently adequate to explain whatever abnormal acts he might have committed.

The thing to be remembered in this superficial recital of instances is, that there are a great number of people who are to be regarded as practical failures, but who are not to be regarded as mentally affected in the ordinary sense of the term, but the study of whose lives in different periods will show, I believe, all the symptomatic grouping that is commonly found in manic-depressive instances and a delusional insanity of the paranoiac type.

In regard to states of temporary mental incapacity among normal individuals, one is struck with their frequent occurrence and the similarity which they bear to similar periods in the developmental psychosis. I refer particularly to the curious lapses in the developmental periods of the young adults, the period closely fitting in with the time of the appearance of dementia præcox. For weeks, or months, the purely mental capacity of individuals of this type seems to sink very far below their normal, and this is the presence of a physical state of wellbeing. For reasons not readily explainable, such an individual, after he has attended a university, for example, will find that he is falling off from his accepted standard of work, that he becomes somewhat irregular in his attendance, that he is given to the pursuit of pleasures unusual to him, and that he frequently feels, and confesses at times, a sensation of personal 'breaking-up.' I have met with this so frequently in the study of young students that it has been suggested that most normal individuals pass through a period where certain phases of dementia præcox become almost susceptible of actual demonstration. In many of these cases the suspicion of præcox was so strong that it was noted in their histories. I refer particularly to the dementia phases of the disease. The evanescent nature of what might be called 'mental incapacity' precluded the possibility of its being placed in the symptomatic grouping of dementia præcox; but, at the same time, in support of the contention upon which this paper is based, it will be noted that the frequency of temporary states of mental incapacity is such that their occurrence should be carefully noted.

It is said, and held to be true by good authority, that a change in personality is a positive indication that an individual is to be considered insane; that is, under the influence of a delusion. If the individual's personality partakes either wholly or partially of the traits in the guise of the figure whose subject the delusion embodies, that person becomes changed to so great a degree that he can no longer be considered as

sane. I suppose that the rôle of the delusions is a mark of insanity in such a case, and I am sure that in exaggerated instances they form the deciding factor which weighs in the balance in favor of the theory that the person is insane. The personality of an individual is an outward expression of himself as revealed by our examination, something we can know about as a tangible proof of the individual's differences. Personality is objective at least in the sense that it is open to our examination and analysis, however intangible and subtle its deeper elements happen to be. How frequently, however, do we see a personality change under our eyes, as it were, and how frequently does the change take place as a result of fixed beliefs which are not delusional and not altogether false, but which have some elements common to both? If the change is a good one, we call it evidences of the individual's progress and improvement; and abnormal and the evidences of mental instability, if the reverse is true. But in all its essential elements we are dealing with the same kind of alteration in personality which in other instances is regarded as an unerring mark of insanity, perhaps the only positive and unassailable proof upon which that diagnosis may be based.

Under the term 'social delinquency' may be included acts of a grossly unconventional sort, performed by people to whom the conventions have been hitherto controlling forces of a strictly inhibitory character. Freed from the influence of alcohol and other extrinsic factors, such acts stand apart because of their lack of fitness to the individual who performs them. They are good examples of the abnormal conduct manifested now and then by presumably normal individuals, limited in their scope to matters of social intercourse.

Such acts, and all of us know them, by their very queerness and bizarre quality, are by themselves acts as we are wont to typify as common to the insane. Frequently they are the result of strange impulses, which overleap the barriers of usage and custom, and leave their performer, as well as the observers, puzzled and mystified. Any explanation that might be offered as to their mechanism would be forced to assume such a change in conduct as would result in an act that is essentially insane. The point to be made here is, that the act itself, as well as the state of mind during its performance, bears all the earmarks commonly attributable to an insane individual and to an action for the consequences of which no personal responsibility is attached.

The time is too limited to extend to further length this exposition, by a further recital of illustrations so common, I feel sure, in the experience of all of us.

I scarcely need mention those variations of conduct caused by emotional stress, the acute maniacal symptoms of ungovernable rage, the negativistic reactions of the stubborn, or morose individuals, the katatonic-like postures and gestures of the victim of fancied injury, these and

numerous other instances common in our observation of other people, and to some, perhaps in ourselves, would serve to illustrate, if further proof were necessary, the main contention of this paper.

This contention is, briefly, that in a study and analysis of the variations of the normal individual, in his environmental reactions, may be found sources of information which will help towards an understanding of the genesis and development of some of the main concepts implied in the term 'insanity.'

THE PRINCIPLES OF THE TECHNIQUE OF SKIN-GRAFTING.

By ARTHUR E. HERTZLER, M. D., of Kansas City, Mo.

The fundamental factors of skin-grafting and wound healing in general are the same. The preliminary steps in both cases are the exudation of serum, and its coagulation with the production of fibrillar fibrin. Opinions differ as to the subsequent steps in the healing process, but there can be no question as to the preliminary changes.

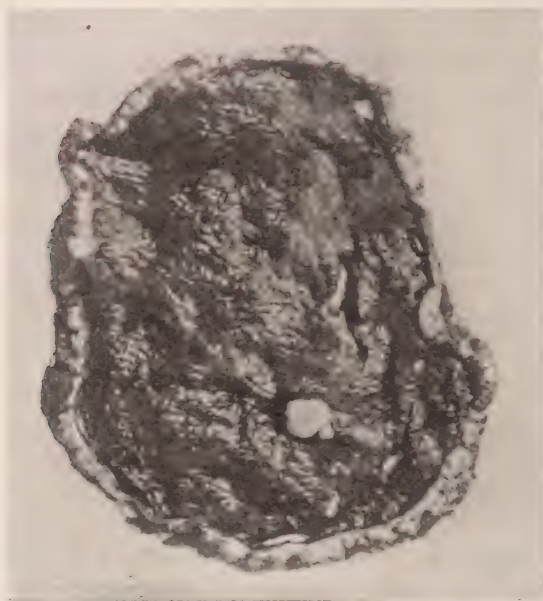
Skin-grafting, however, differs from ordinary wound healing in that the transplanted epidermis must depend for its nutrition upon the tissue to which it is applied. Healing, therefore, must be by primary intention. In wound healing, on the contrary, the tissues having independent sources of nutriment are able to live even if the coagulation of serum between the opposed surfaces is delayed.

The failure of any wound to heal primarily in the strict histological sense is dependent upon two factors. The serum may possess some inherent defect which makes coagulation imperfect or impossible. A variety of constitutional or local conditions, unnecessary to enumerate, may produce this result. In the second place, the serum exuded may have the inherent properties necessary to produce a proper coagulum, but some agent with which it comes in contact may prevent coagulation, or may destroy the fibrin before fibrous tissue has had time to form, whether this occurs by transformation of the fibrin or by the replacement of it.

Failure of a skin-graft to grow, may, therefore, be dependent upon some defect of the serum of the body due to constitutional disease, such as diabetes or anemias, or to extreme vascular changes in the region to be operated upon. These conditions can be remedied only by treating the general disease. Vascular disease in a particular location may be but a part of a general vascular disease, as in the extremities of the aged, or it may be local and dependent upon the disease or injury which has given occasion for the grafting. To follow out all these possibilities would lead us too far afield. Suffice it to say that in case of a suppurating wound, to cite a single example, the formation of a layer of fibrin covering it is interfered with by the bacterial poisoning. Vascular tufts spring up and become surrounded by an imperfect connective-tissue which resembles hyaline connective-tissue closely, but cannot be called a degeneration because it has never attained a higher state from which to degenerate. The difference between this perivascular tissue and that surrounding a normal vessel is that it does not contain the material neces-

sary to cause coagulation of the escaped serum. This material is most abundant immediately beneath the endothelium, but is present in any tissue. The result of an attempted skin-graft in such an area is that, when the surface is prepared to receive a graft, the serum does not coagulate and the graft does not become attached.

In order to escape this difficulty, cicatricial and granulation tissue must be removed from the surface in order that a bed with normal vessels can be obtained. The common practice of using a curette is to be avoided in all except very fresh granulations, and in these, it is not ideal. A sharp knife prepares a better bed, because scar tissue when met is severed, and the bed is made smooth, so that the graft will lie evenly.



Excised Varicose Ulcer.

When a curette is used tags of tissue and little cicatricial nodules remain to interfere with a proper adaptation of the graft to its base. The importance of this point can be fully appreciated only by examining microscopically a portion of an improperly prepared bed. It must be remembered that the unit of growth is the cell, and not an area of skin measured by inches. The accompanying illustration represents an old varicose ulcer which has been removed *in toto* with a knife, so as to leave a smooth surface to receive the graft.

Some surgeons transplant the grafts directly upon the granulating surface without previous preparation. If the granulations are so young that a normally coagulable serum exudes from the surface, and the surface is not too uneven to prevent exact coaptation, removal of the

surface is not imperative. These conditions are met with only in fresh granulating surfaces which have not been subjected to violent infection.

In addition to having a properly prepared surface, with a vascular supply capable of furnishing a proper serum, a graft in order to be successful must be properly managed. Areas which require grafting frequently bleed profusely when the surface is removed. When the bleeding stops spontaneously, it does so by coagulation. When heat is applied, as with hot compresses, bleeding is checked in part by coagulation, *i. e.*, precipitation of the albumin after the fashion of boiling an egg. The result of this is quite different from spontaneous coagulation. It is not a real process of coagulation such as occurs when fibrin separates, but is a deposition of granular material which bears no relation to fibrin. Calling it coagulation illustrates again the folly of naming a process by analogy and then basing arguments upon the assumption. The formation of fibrin is essential to wound healing. The precipitation of albumin by heat produces a debris which acts as a foreign body, and must be disposed of before the usual processes of healing can take place. Heat and chemicals should, therefore, be avoided and compression by dry gauze alone depended upon to produce hemostasis. The more persistently a surface bleeds the more necessary it is to avoid the use of artificial means to produce hemostasis. The mere persistency is an indication that the coagulating power is reduced, so that a more careful technique than ordinary will be required.

When the bed is ready and the hemorrhage has ceased, the grafts may be prepared. The section should be made as deep as the papillary layer in order that a serum-bearing tissue may be secured. Anything that interferes with the preservation of this serum must be avoided. The common practice of sliding the flap on a knife covered with water or salt solution is to be avoided because it dilutes the serum, and prevents the formation of fibrin. Floating the flaps on water is, of course, doubly mischievous. Allowing the flap to remain exposed after it is severed and before it is applied to the surface prepared to receive it is to be avoided, because the serum coagulates before it meets the serum of the base.

The ideal technique, therefore, demands a surface which has a normal vascular supply, and which has been cut perfectly smooth with a knife, the bleeding, if excessive, having been stopped by compression with dry gauze. Serum should be oozing from the surface from numerous fine points, and blood is not objectionable if not in too great amounts. If, then, the graft is placed upon this surface immediately after it is cut from the surface supplying it, the serum of the two surfaces will be uncoagulated, and will mingle. The fibrin that is formed will extend from the interstices of the one to the interstices of the other. These bands of fibrin furnish clefts in which the nutriment may travel from the base to the graft and supply a scaffolding for the permanent con-

nective-tissue. The writer's published studies of the formation of fibrous tissue, and Burrows' studies (personal communication) of tissue growth *in vitro*, go to show that fibrin bands precede the passage of cells in the process of the formation of fibrous tissue. Whether these bands remain permanently, as the writer's studies seem to him to show, or whether they are afterwards replaced, does not lessen the importance of attaining these desirable conditions for successful growth.

When these fundamental conditions are met in the operation of skin-grafting, subcutaneous connective-tissue may be carried with the grafts in considerable amounts without jeopardizing the success of the operation, thus securing a skin-graft instead of the usual epidermal graft.

When the ideal conditions for the graft are obtained, the question of dressing and after-care is a matter of indifference. The writer's own method is to cover the engrafted area with strips of gauze lightly smeared with vaseline. These are changed after five to seven days. After this, daylight is the ideal dressing.

SUMMARY.

1. The surface to be grafted should be prepared with a knife, not with a curette.
2. Bleeding from the prepared surface should be controlled with pressure with dry gauze, heat and moisture being avoided.
3. The grafts should be transferred without the use of moisture of any kind.

POISON OAK EXPERIMENTS.*

By EDWARD VON ADELUNG, M. S., M. D., of Oakland, Cal.

If one attempts to put on paper what the profession really knows about rhus poisoning, one finds but little to record. The wide distribution throughout Canada and the United States; its appearance as shrub or vine; its distribution by birds that feed on its seed; the dermatitis that follows contact—such knowledge is at hand. But asked why the plant causes dermatitis, or why some people are poisoned and others are not, or how poisoning occurs without contact with the plant, or why the dermatitis recurs at the same season of the year without re-exposure, or how the burned plant in the form of smoke can be toxic, or why there is an incubation period, or whether the dermatitis is contagious, or whether the eruption is spread by the blood or lymphatics, or how to cure the disease, or whether one can secure immunity by eating of the leaves, or many other very interesting and practical questions—the profession is at a loss for an authoritative answer. The only useful preventative measure generally known is to avoid the plant, and many are surprised to learn that poisoning occurs without contact with the plant.

Noting the wide geographical areas infested with this family of poisonous plants, noting the thousands of people that suffer annually, noting the large monetary loss to these individuals and to the construction companies operating in regions where the plants abound, is it not a little surprising that so little serious investigation has been directed to avoiding the evil, even though no deaths can be laid at the door of this poison?

The present investigation is an attempt to apply the experimental method to some of the problems—a method that has been sadly neglected in the study of local treatments for skin diseases, though just as applicable to any one as to rhus dermatitis. It is more than likely that if the innumerable prescriptions for the local treatments of skin diseases were subjected to the control experimental test, a mass of empirical formulæ would soon be discarded, and we would be nearer an intelligent therapy—a much-needed reform.

The control experimental method consists of applying the chosen therapeutic agent to a selected area of affected skin, employing other areas for controls. If possible, symmetrical areas are chosen for obvious reasons. In applying this method to the study of poison oak, symmetrical areas were purposely poisoned, one being treated and the other used for control. Or, in many cases where the patient had been poisoned acci-

*The complete work, of which this is an extract, will be published later.

dentially, half of the body was treated while the other half was left for control. Other non-therapeutic questions were studied by simple experiments as detailed below.

This article is confined to a study of the following questions:—

- (a) Does the toxin spread through the medium of the body fluids?
- (b) Is the dermatitis contagious?
- (c) Is the toxin destroyed by 100° C.?
- (d) Is the toxin volatile?
- (e) How does poisoning occur at a distance?
- (f) What is the therapeutic value of certain remedies?

In order to answer the question whether the body fluids distribute the poison, or whether the dermatitis is purely a local manifestation of a local irritant, the following experiment, with manifold repetitions, was done.

Experiment I.—Limited areas of skin were poisoned by applying active tincture of rhus diversiloba. The mechanical transference of the poison was prevented by covering the spot with zinc oxide plaster. On removing the plaster after twenty-four hours, the spot was thoroughly washed with alcohol, or soap and water, to remove any poison remaining on the surface. In every case the dermatitis was limited to the exact location of the application. It is, therefore, concluded that the eruption does not spread in the body fluids.

Learning that many persons entertain the notion that the serous discharge from rhus dermatitis is poisonous, the following was done with repetitions.

Experiment II.—Blebs of the dermatitis were opened, and the serum therefrom rubbed into the writer's own arm and into new areas of the patient's body. In no case was the writer able to cause a new area of dermatitis. The serum is, therefore, regarded as innocuous.

In connection with the question whether the smoke from burning rhus plants is poisonous, as generally held, the cognate question arose, Is the toxin destroyed by 100° C.? If, as stated by Pfaff, the toxin is easily destroyed by heat, then one would expect apriori that burning of the plants would not be attended by danger from the smoke. To test this point the following experiment was done.

Experiment III.—Fresh poison oak leaves were placed in the bottom of a test-tube. The tube was then submerged, except the open end, in boiling water. At the end of one hour a leaf was taken from the tube and applied to the writer's arm. Within twenty-four hours a lively dermatitis resulted. The conclusion is, therefore, reached that the toxin is not destroyed by 100° C., though continued for one hour. The bearing of this experiment on poisoning by smoke is evident. The smoke can readily carry particles incompletely burned, thus remaining toxic. Indeed, there is reason to believe that a moderate degree of heat favors dermatitis.

The long observed fact of poisoning without contact with the plant gave

rise early to the belief that the poison is volatile. All writers on the subject beginning with Van Mons in 1779, came to this same opinion. Not until one hundred and eighteen years later was this view changed, when Pfaff, after extracting the poison, showed experimentally that it is not volatile. The following experiment illustrates the non-volatility of the toxin.

Experiment IV.—Young, fresh poison oak leaves were crowded into a glass tube, one end of which was closed with cotton. Holding this end against the skin of a susceptible person, air was blown through the tube. The spot struck by the air-current was then covered by zinc oxide plaster to retain what poison might have been deposited, and after forty-eight hours the spot was inspected. Were the poison volatile, a dermatitis should have resulted. The result was negative.

Finally, some tests were made of therapeutic agents, employing the control method as follows.

Therapeutic Tests.—Aristol having been highly recommended, the following test was made. The left of two symmetrical skin areas, purposely poisoned, was treated during five days with a solution of aristol in cotton-seed oil. The control received no treatment. Both areas were scratched. The untreated area recovered first. Therefore, aristol is not curative.

Quite different were the results when potassium permanganate was employed. As a preliminary experiment, the following was done.

A mixture of equal parts of potassium permanganate and active tincture of *rhhus* was tested on the writer's arm and found to be absolutely non-toxic. It thus appears that by chemical action the toxin is destroyed by permanganate of potassium. Potassium permanganate was then tested clinically as follows: One of two patches of dermatitis was painted with potassium permanganate. The treated patch healed earlier than the control.

A. B., male, *æt.* twenty-three, was poisoned four days ago. His whole face is edematous, and the right eye is closed. Hot applications of 2 per cent. permanganate of potassium were begun, but applied to the right side of the face only. In thirty hours the right eye was in good condition. The left side recovered tardily.

A. E., male, *æt.* forty-five, dermatitis one day old. Whole face swollen, eyes half closed by edema of lids; right ear much swollen. Thirty hours after dermatitis began, hot permanganate saturated solution was applied to all areas. The application burned severely, especially the eyelids. Recovery occurred in five days, though this man had always before been two weeks getting well. A weaker solution would perhaps have been better.

Potassium permanganate is, therefore, curative. It acts probably by combining chemically with the toxin, and is, therefore, more effective early and when the papules and vesicles are opened by vigorous rubbing with the remedy.

There are two objections to the use of potassium permanganate. (1) It produces a mahogany-brown stain which at times is difficult to remove. But a one per cent. solution of oxalic acid usually removes the color. It should not be forgotten that this acid is a violent poison and should be used with great caution. (2) After the use of the permanganate and oxalic acid the skin is often left severely cracked. This is met by soothing ointments or oils.

Peroxide of hydrogen, ammonia, hyposulphite of sodium, and other commonly used applications tested by the control method showed little or no therapeutic value.

Treatment.—Bearing in mind that the disorder is caused by a poison on the skin, the first thing to do in treating the dermatitis is to forestall the appearance of new patches by removing all poison from the surface. This is easily accomplished by a soap-and-hot-water bath of the whole body, especially the hair. After the bath, fresh clothing should be put on, not even wearing the shoes that were near the plants. The itching is relieved by water as hot as can be borne, and is often a pleasant treatment. Remedies, palliative or curative, may then be applied. When the vesicles become infected with bacteria, the dermatitis is quite different, and will call for antiseptic or bactericidal treatment. Potassium permanganate will then be found of small value, and hot bichloride packs of much value. The following hospital case illustrates this point.

A twenty-five-year-old male was poisoned four days ago. Both arms showed marked edema, vesicles, and pustules. He had already applied cold permanganate six or seven times, so hot permanganate was applied frequently by the nurse. There was no improvement in twenty-four hours. When the solution was changed to hot bichloride, and the arms bandaged with the same solution, recovery began and progressed rapidly.

Résumé.—It therefore appears that the toxin of *rhus diversiloba*, in contact with the skin of susceptible persons, causes a non-contagious dermatitis, strictly localized to the areas of contact, and not distributed by the blood or lymphatic streams. The toxin is not destroyed by 100° C. for one hour, is not volatile, and poisons 'at a distance' only through mechanical carriers. The most valuable remedy yet known is potassium permanganate which is most effective when applied hot.

THE PRESENT STATUS OF QUININE AND UREA HYDRO-CHLORIDE AS A LOCAL ANESTHETIC.

By SAMUEL T. EARLE, M. D., of Baltimore.

Since the introduction of quinine and urea hydrochloride as a local anesthetic, by Drs. Arthur E. Hertzler, Roger B. Brewster, and Ford B. Rogers, we have used it quite extensively in most of our cases which were operated upon with local anesthesia.

When the writer first saw the notice of its use as a local anesthetic, he recalled, to his assistants, his experience with this remedy in 1870, when it was highly recommended by the late Dr. William T. Howard, of Baltimore, in obstinate cases of malaria, especially when the patient was unable to take a sufficiently large amount of quinine by the mouth to control the fever. In every case in which the writer used it at that time he saw extensive sloughing; and although at present he is unable to recall the strength of the solutions used, he thinks they must have been much stronger than those recommended by Dr. Hertzler and others. Nevertheless, another trial was given the remedy for its local anesthetic effect in the strength they recommended.

In several instances both Dr. Arthur Hebb and the writer found, as Dr. Hertzler had, that when we exceeded a 3 per cent. solution, healing was always retarded, but no other bad results followed, such as sloughing, etc.

In April, 1912, Dr. Hebb saw quite an extensive abscess following the use of a 1 per cent. solution for the removal of internal hemorrhoids. At that time he attributed this bad result to meddlesome interference by a careless nurse. A few weeks subsequent to this, the writer's assistant at the Hebrew Hospital, Dr. Lewis J. Rosenthal, had 2 cases of sloughing to follow the use of a 2 per cent. solution of quinine and urea hydrochloride in the operation for hemorrhoids. He assured the writer that he had been very careful and that there had been no defect in his technique. In July, 1912, the writer operated upon a case of mixed hemorrhoids, using a 2 per cent. solution of quinine and urea hypodermically as a local anesthetic. The wound seemed to do remarkably well, but on the third day the patient's temperature rose to 103° F. and continued to do so daily for four or five days. Not until the fifth day did the wound show any sign of breaking down; on the fifth day there was a distinct slough, of considerable size, beneath the mucous membrane and above the external sphincter; this was purely necrotic tissue, but not a drop of pus had thus far formed. After a few days the slough broke down and a liquid pus was discharged.

Dr. H. H. Rightor,* of Helena, Arkansas, has reported a similar result following the use of quinine and urea hypodermically in an operation for circumcision. As this was a typical case, the writer thinks it well to submit an extract from it: "The operation was perfectly satisfactory so far as the anesthesia was concerned. On the day following the operation there was considerable discoloration of a violet hue; this lasted until the fifth day when the silk-worm sutures were removed. The tissues were still anesthetized; on the seventh day there was a foul odor, and a well-marked localized gangrene, extending to the line of infiltration, entirely around the line of incision; but no suppuration. With tissue forceps this gangrenous mass was lifted out *en masse* leaving a raw surface."

Dr. James P. Tuttle, of New York, told the writer in September last that he had to abandon the use of quinine and urea as a local anesthetic, for the same cause.

The writer thought it well to report these results so that others might be benefited by them, especially those who are in the habit of using this solution only occasionally.

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THE ADVANTAGES OF THE NOGUCHI TECHNIQUE IN THE
DIAGNOSIS OF SYPHILIS.

By FLORENCE W. MILLER, of St. Louis.

Having had several inquiries as to the methods employed in the Noguchi technique—the preparation of antigen, complement and amboceptor, the latter especially causing considerable difficulty in procuring a sufficiently high titre, it occurred to the writer that perhaps her observations might be of avail to others.

The Noguchi technique in the hands of a competent and conscientious worker is both accurate and fairly simple, the manufacturing of the reagents being the only real work entailed. The antigen employed—an acetone insoluble extract of a normal beef heart—is preserved indefinitely as a liquid by dissolving 1.5 grm. of the 'sticky mass' of antigen in 5 c.cm. ether and 45 c.cm. methylalcohol. The complement is obtained from good-sized guinea-pigs with an ordinary antitoxin syringe, drawing about 3 c.cm. of blood from the pig's heart, thus preserving the pig for future use. The blood is allowed to stand at room temperature until the serum separates, and is then removed to the refrigerator without disturbing the clot until ready for use, and should be at least twenty-four hours old, for the writer has observed that complement used before then is not reliable.

The amboceptor is the most difficult to make, and entails much work and patience in its production unless one is established in a laboratory with all necessary facilities. First of all, the rabbits must be of fairly good size, healthy and kept in a warm, clean room; fed regularly with fresh, clean vegetables and grain, and given a clean bed of alfalfa hay. Water should not be given at any time, otherwise a paralysis of the lower half of the body and extremities is liable to develop.

The blood is procured from one of the median superficial veins of any individual, using a fairly large hypodermic needle attached to a rubber tube about 8 in. long, extending into a sterile flask, the capacity depending upon the amount of blood desired. The blood is defibrinated by means of small pieces of sterile gauze wire, vigorously shaken as soon as the blood is expressed. It is then thoroughly washed, at least four or five times in a 0.9 per cent. sterile salt solution, and must be free from clots. The advantage in using a fairly large needle in procuring the blood is that the flow is rapid and clotting does not occur so readily. Mistake is frequently made in the introduction of the needle at a too acute angle with the arm. The

needle should be plunged into the vein at an angle of not less than 45° , thus preventing the awkward complication of extravasation of blood under the skin.

The rabbits are given five injections of the warmed blood intraperitoneally, but the writer has found it advisable to divide the fifth dose into two parts to be given on successive days. On the eighth or ninth day after the last injection the rabbit is bled. By this method the writer was able to obtain an amboceptor whose titre was exceptionally strong (.0005 c.cm.). A good titre may fall anywhere between .001 and .0007 c.cm.

The technique employed in the tests is simple and quick. The Wright tubes, used in collecting the blood to be tested, are made over a Bunsen burner, using a tubing with a bore of about 5 mm. The thumb or finger is cleansed with alcohol, thoroughly dried and stuck with a sterile Hagerdorn needle, allowing the blood to flow directly into the capillary. Sufficient blood is collected (about 1 c. cm.), the ends sealed with ordinary sealing-wax, the serum allowed to separate at room temperature, and then it is placed on ice until ready for use. The simplicity of this feature of the technique impressed the writer strongly, when it was put into practical use in different wards in the New York hospitals by obtaining specimens from babies ranging in age from a few weeks to two years. Over one hundred specimens were collected and were tested under the personal supervision of Noguchi. The writer may say that all these gave a negative reaction with *negative physical findings*, with the exception of 2 congenital cases of syphilis and one which had received salvarsan two weeks previously.

The pipettes and test-tubes must be thoroughly cleansed in clear hot water and dried in a drying oven before use; the salt solution must be sterile.

The serum, complement, antigen, salt solution, and amboceptor are put into their respective tubes, incubated at 37° C. in a water-bath for thirty minutes, then the red blood corpuscles are added and incubated for one hour. Usually a reading may be taken in one and a half to two hours from the time the tests are started.

With absolutely dry, clean glassware, proper reagents and a negative and positive control, one may rely upon the results obtained. Negative and positive controls are run with the tests.

The best pipettes are about 37 cm. in length with the graduations beginning at the tip extending half the length of the tube. With such minute quantities of the reagents (0.1 c. cm.) to a test, these tubes are of a great advantage.

The water-bath used by us was specially devised, and consists of a copper tub 43 cm. by 24 cm. by 28 cm., resting on a heavy zinc base 43 cm. by 25 cm. by 28 cm., having small perforations extending round top and bottom, causing an even diffusion of heat from an ordinary burner.

The copper tub holds a perforated copper tray upon which the rack rests during incubation. This tub has a capacity of about six gallons, and with an attached thermoregulator maintains a fairly constant temperature, with the addition of a little water now and then to allow for evaporation. A faucet provides a suitable drainage when the tank is to be emptied.

Frequently one is asked, Is not the Noguchi test more delicate than the Wassermann test, thereby obtaining more positives than by the Wassermann test, and is not the Noguchi test *too delicate*? In response to the question as to the Noguchi test being more delicate than the Wassermann test, the writer would substitute the term 'accurate' for that of 'delicate,' because in the Wassermann technique there are two undeniable factors which strongly influence the reading of the reaction: (a) the amount of natural hemolytic amboceptor of the sheep corpuscles which the human serum contains and (b) the inactivation of the patient's serum. The human serum contains all the way from a fraction of a unit to 20 units of natural anti-sheep amboceptor. Kaliski, the pathologist of Mt. Sinai Hospital, New York, found in the examination of 200 cases, 53 per cent. of the serums containing from a fraction to ten or more times the amount of amboceptor necessary to hemolyze completely the bulk of sheep corpuscles to a test (1 c. cm. of a 5 per cent. solution of blood corpuscles). Noguchi also states that human sera contain all the way from 0 to 20 units of natural anti-sheep amboceptor.

One can readily conceive how the established unit of amboceptor, plus any amount of unknown natural sheep amboceptor contained in the human serum to be tested, could cause a hemolysis even in a positive serum, thereby giving a fallacious reading. In Wood's laboratory at St. Luke's Hospital, New York, the writer saw this demonstrated on several occasions.

The second factor, the inactivation of the patient's serum, may also cause an error in the reading, as the heating of the serum at 56° C. for thirty minutes materially weakens its antibody content even to the extent of 1/5 its original strength.

With these two possible errors in view, which may and do occur in some sera, why should not the Noguchi test give more positives in luetics than the Wassermann test, when the Noguchi technique does not have these conditions of error to cause fallacious readings? However, there are two corrections now being made by some investigators, which make a material difference in the readings of the Wassermann test, both necessitating much labor and time—namely, the absorption method, which consists in removing the natural anti-sheep amboceptor from the patient's serum by the addition of sheep corpuscles, centrifugating and testing for hemolysis until all is removed. The other correction consists in the removal of the complementoids which are formed in the inactivation of the human serum. The complementoids are removed from the pa-

tient's serum by the addition of a 7 per cent. suspension of barium sulphate and centrifugating.

The chief advantages of the Noguchi technique are (a) the specimen of blood to be tested, 1/10 the amount necessary in the Wassermann reaction, is taken from the finger thus obviating the technique required in drawing the blood from a vein; (b) antigen, which is made from normal beef heart, syphilitic fetus or liver employed in the Wassermann test, is not always obtainable; (c) the amboceptor may be preserved on paper for an indefinite time, the Wassermann test requiring a more or less constant maintenance of rabbits for a satisfactory liquid amboceptor, which frequently deteriorates within several months; (d) less complement is required for the same amount of guinea-pig serum, two and one-half times the number of tests can be run in the Noguchi technique; (e) the red blood-corpusele suspension can be obtained from the finger of the person employing the tests or from any other individual; this is far more practical and economical than the keeping of a sheep for that purpose of the United States, in the Pasteur Institute of Paris, in all the state hospitals in New York as well as in those of different states and in different chemical laboratories.

The amount of complement which the active serum contains has been attacked as a possible source of error in the Noguchi technique. It must be borne in mind, however, that in the small amount of active serum that is used (.02 c. cm.) there is so little complement that even ten times the amount would not act upon the human corpuscles; but aside from this, this source of error is absolutely removed by using the acetone insoluble antigen, thus eliminating the proteids. Quoting Kaliski: "The amount of active serum used in a test (.02 c. cm.) is not sufficient to cause non-specific fixation. My comparative analysis of over 700 cases, using active serum in the Noguchi method and serum heated to 56° C. for thirty minutes in the Wassermann method, proves this conclusively."

As for the Noguchi serum diagnosis of syphilis being *too delicate*, the strongest argument that can be raised in its defense is that in this method one is working with absolutely known quantities whose units have been formally standardized and which remain fixed.

This method is now adopted in the Army and Navy Medical Schools of the United States, in the Pasteur Institute of Paris, in all the state hospitals in New York, as well as in those of different states and in different chemical laboratories.

Theoretically, the Noguchi technique seems above criticism; and in the hands of a conscientious and intelligent worker should be also above reproach.

Wall Building.

WEAK FEET IN CHILDREN.

By ALEXANDER E. HORWITZ, A. M., M. D., of St. Louis.

The term flat-foot, so frequently and universally used, is in reality not always applicable to this condition. We quite frequently see a weak or painful foot, giving all the symptoms of a broken down arch, which, upon examination, is found to be what is commonly called normal. Again, a foot with a very low arch or one in which no arch is apparent often does not give rise to any symptoms which call for surgical interference. Observations have been made which show conclusively that no absolute relation exists between the height of the arch and the intensity of the symptoms. The method usually employed to determine whether the arch is high or low, by taking an impression of the foot upon smoked paper, is in reality of little or no importance. This will frequently show, as in the writer's case where one foot in which painful symptoms existed, the arch was seen to be higher than in the normal foot. There are so many other signs present in the painful foot that the low arch, if present, is not of primary importance. We must bear in mind that we are dealing with a weak foot, a foot which has deviated from the normal in shape, function and value. The weight of the body is no longer evenly distributed, the centre of gravity is disturbed, and a feeling of insecurity prevails. The foot is distorted, weak and painful. The patient walks with a slouchy attitude, wears his shoes down on the inner side, and the ankles by coming in contact during walking cause great discomfort. The fore part of the foot is deviated from its normal axis, pointing outward; little weight is borne by the outer part of the foot; the inner ankle is prominent. The term weak-foot will, therefore, better describe the condition than flat-foot.

This condition, like all other deformities, may be either congenital or acquired. The congenital type need be but briefly mentioned. Here the foot is extremely abducted, the arch entirely absent, and a bulging noted where the arch normally should be. Frequently this bulging is merely due to a pad of fat, the arch being normal beneath it. In reality this is but a mild form of calcaneo-valgus, and should be treated as such. The rigidity and deformity should be forcibly overcome, and a plaster-of-Paris dressing applied, followed by after treatment of massage and passive motion.

The acquired weak foot may be due to one of many causes. In young children there are four possible causes. Undeveloped musculature and ligamentous structure (weak ankle) is the more common cause. In the

child an acute infectious arthritis, of whatever origin, seems to have a special predilection for the joints of the foot. This condition is seen following acute infectious diseases such as scarlatina, measles, typhoid fever or even tonsillitis.

An unusual condition seen now and then is a weak foot during or following a case of gonorrheal urethritis. This latter condition in children is not as rare as we would like to suppose. During the last month the writer was called upon to see two children, girls eleven years old, who were suffering with painful feet. Upon examination a tender spot



Fig. 1.—Moderate knock-knee with everted feet. No attempt at self-correction.

was found at the tubercle of the os calcis (in both); in one the ankle-joint and in the other the knee-joint was swollen. This combination of periosteal involvement of the os calcis and arthritis of any joint of the body always leads the writer to suspect the presence of gonorrhea; and in most cases he is correct. In these two children acute urethritis was found and the gonococcus demonstrated.

The other two common causes of weak foot in the child are deformities at the knee. Both in bow-legs and knock-knee (Fig. 1) an abducted and weak foot results. How these are produced will be mentioned later.

A great contrast will also be noted between children of school age and those who are older. In the former it is the deformity which will lead the parent to seek consultation, for very seldom does the child offer active symptoms of pain or discomfort. The mother notices that the child does not walk properly, and becomes alarmed. In children past school age, it is the painful condition for which relief is sought, the deformity being noticed only secondarily. In both cases exceptions are naturally found.

In the feet of children past school age, in those who suddenly change



Fig. 2.—Moderate knock-knee, with everted feet, showing attempt on part of child to correct disability by turning feet in. Note separation of great toe from other toes.

from a life tending toward the sedentary to one of great activity, marked disturbances are seen. Especially is this noted in children required to walk much, carry loads or stand upon their feet the greater part of the day. Here we see the extremely painful foot, a foot of low ligamentous tone. In active school children who mingle exercise with rest, a flat foot is seen, but seldom a painful one. This improper gait consists either of an intoeing or out-toeing. Of these two conditions, it is curious to note that the one offering the less real danger is the one which at-

tracts the mother's attention the more and will cause her to seek consultation. The writer means the inoffensive intoeing. To the mother's eye it is an offensive deformity, while in reality it may be merely an unconscious attempt of the child to correct some other existing condition. A foot turned in is really a stronger foot than one turned out, and is one less liable to cause trouble later on. Two conditions produce an intoeing or pigeon-toe. One is a tendency to varus deformity, which can be easily overcome by correcting the shoe, and the other a forced attempt, an unconscious desire, on the part of the patient to correct a flat-foot arising from a knock-knee. In knock-knee the tibia is rotated outward, carrying the foot with it and producing a marked flat-foot. This is a very uncomfortable position, and proper weight-bearing is greatly interfered with. The line of gravity is disturbed and an unconscious attempt on the part of the sufferer is made to correct this by turning the foot inward. Even where the flat-foot still remains, it will be noticed that the big toe is widely separated from the other toes (Fig. 2), and tends towards the centre line. This is a characteristic difference between the flat-foot of a knock-knee and that of a bow-leg where the entire foot is everted. Now, where this condition obtains, *i. e.*, where the pigeon-toe is a corrective position, it would be folly to attempt to correct it. To do so would but exaggerate the original deformity at the knee and destroy what compensation had been attained. In all cases of intoeing it would be wise to examine the knees. Where, on the contrary, the flat-foot in combination with knock-knee exists, overcorrection by pads and Thomas shoe is of great value. This tends to reestablish the line of gravity and body balance, and *per se* tends to improve the knock-knee.

The opposite condition is seen in bow-legs. Here the tibia is rotated inward, and the foot carried with it, producing an impossible posture of exaggerated varus inversion. Unconsciously the foot is everted and carried to extreme valgus in order to obtain a firm weight-bearing surface. Again this eversion and abduction tend to throw the knees closer together and partly correct the bowing. Here the flat-foot is not painful, and should be corrected with caution. To allow it to remain would be courting trouble for the future; to correct it would produce harm at the knee. The bow-leg should be the main object of our attention, and correction should be directed toward it. The foot should be supported by a pad merely as a support and to give a better leverage to the limbs. The Thomas shoe, or any means which would tend to invert the foot, should be avoided. From all this we can deduce the very safe rule that a compensated foot, either an intoeing or an out-toeing, should not be corrected or interfered with.

The term 'child' will be broadened to include the adolescent, both male and female. At this period many disturbances arise, either directly or indirectly connected with the development of the genitalia, internal or external. Chief among these disturbances, bone changes with conse-

quent ligamentous and muscle instability have been noted. The increased vascularity of the bones, in which the tarsus participates, causes a weakening of these structures, and where undue stress or strain is imposed this disturbance becomes exaggerated. In the tarsus, when the bones are softened and the superimposed weight increased and bodily activity heightened, a series of disturbances arises which produces a painful condition in the entire frame-work.

At this period we note two kinds of weak and painful feet, one in the male, the other in the female. Among men, the over-developed or rather

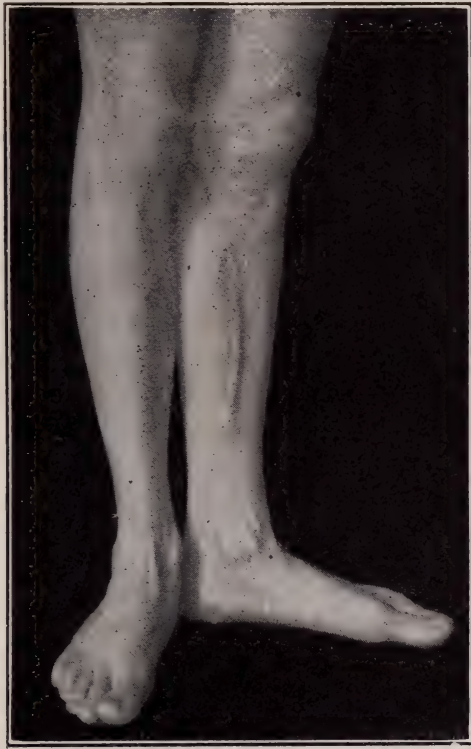


Fig. 3.—Adolescent flat-foot (male) showing undeveloped musculature.

the 'overgrown' present feet which are rather peculiar. In these individuals the limbs are long and out of proportion to the length of the body. The foot is large and bony, and musculature scant and undeveloped (Fig. 3), the ligamentous structure under-developed, resulting in a type of foot which is extremely weak. No external cause can be assigned for the weakness. The foot is not unduly abducted nor deformed. That it is not a normal condition is attested by its weakness. The low arch here is merely a sagging of the ligamentous structures, the pain due to the subluxated framework. This type if allowed to remain will progress toward

the rigid foot with abduction and spasm of the peronei. Rigid valgus or spastic flat-foot is not an uncommon condition in the adolescent, and is, as a rule, seen in the class of individuals just described. The second type, commonly met, is the small shapeless foot in the female (Fig. 4), a foot too small to bear the weight of the body; no muscle tone, no bony development; all skeletal landmarks hidden by fatty deposits; ligaments lax; arch low; and foot in slight abduction. Here we frequently find points of tenderness over the tarsal bones, more commonly on the inner side, but frequently on the outer. This latter condition is due to the unconscious



Fig. 4.—Adolescent flat-foot (female) showing flabby musculature and shapeless foot.

attempt of the sufferer to correct her disability by walking on the outer side of the foot, resulting in a true periosteal inflammation. This type of foot may persist throughout life, and our efforts should be directed toward strengthening the musculature, and inducing bony growth. Here, merely giving a plate, as is frequently done, does not only not relieve the condition, but acting as a splint prevents exercise and aggravates the original trouble. Exercise is what is here demanded, and a foot as little hindered in its normal motions as possible. A pad accurately built in the

shoe to fill the arch, active and passive exercise with the foot, and good hygiene are the regimen to be followed.

In the type first described (the male), the means for attaining a strong foot varies somewhat. But here also, a plate is best avoided. The bony prominences can ill afford to remain in contact with unyielding metal, as they become irritated and frequently inflamed. Here, as we have said, the tendency to peroneal spasm with consequent rigidity is great. To overcome this tendency or to prevent it, the foot should be tilted somewhat inwardly, the arch raised, and wherever possible, a shoe should be constructed to retain the foot in inversion. This is done by making a sole, and adducting the foot. The inversion is accomplished by raising the inner side of the sole and heel about a quarter of an inch. This contracts and strengthens the tibial group of muscles, relaxes the peroneals, and reestablishes the normal muscle balance. A pad of moderate height is built in the shoe to fill the arch, the pad covered by a thin layer of felt. This latter prevents undue irritation of the tarsal bones. Exercise for the foot, active and passive, is also of prime value. General nutrition should, of course, be increased.

Treatment.—The object of treatment in a weak foot should be three-fold: to support it, to strengthen it, and to return the foot to its original shape and function. To support it any of the numerous means in vogue may be employed. But it must be borne in mind that where this is the main feature, it will interfere with the other two objects. As long as the foot is painful, support by felt pads is best. These pads should fill in the arch from the metatarsal heads to the tubercle of the os calcis, and reach in width to the last toe. This should be increased in height every three or four days until relief from pain is obtained. At this stage a cork pad is built in the shoe, measured to fill in the arch with the highest point at the scaphoid, and tapering gradually away in all three directions. Its height should be the height of the felt pad last used (from $\frac{1}{4}$ to $\frac{1}{2}$ in.).

Where a plate is used it will not strengthen the foot, but by splinting it prevent exercise, induce atrophy and increase its weakness. The foot should be given as free and wide a range of motion as possible. A pad permits all this, a plate does not.

In conjunction with this, the shoe, both heel and sole, should be raised on the inner side about $\frac{1}{4}$ in. (Thomas shoe). The shoe should be full height to offer support to the ankle. The child should be instructed in certain simple exercises, or, if too young, the mother should give it passive exercise and massage. The old custom of teaching children to stand with feet everted is very pernicious. This stretches the adductors and inner ligaments and weakens the foot.

Children with weak feet should be encouraged to walk and exercise barefooted. This permits full play of every muscle group, restores lost function and strengthens the entire foot. The practice of walking barefooted, even for healthy children, is beneficial for the same reasons.

A foot of the extremely everted type should be given a shoe specially constructed, designed to adduct the fore part of the foot, raise the arch and supinate the foot. In a foot of this type the folly of using a plate can readily be seen.

In intoeing, not due to knock-knee, a wedge on the outer side of the sole and heel is of great value in overcoming the deformity.

In rigid valgus, spiral adhesive straps, with the foot inverted as far as possible, are of great value. These straps are carried from the outer side of the foot over the sole, across the front to the outer side of the leg. Pads should also be used in connection with this.

MEDICAL AND SURGICAL PROGRESS.

THE POSITION OF THE RADIOLOGIST IN THE MEDICAL PROFESSION. THE OWNERSHIP OF X-RAY NEGATIVES AND PRINTS.

A REVIEW OF RECENT LITERATURE.

By E. H. SKINNER, M. D., of the Editorial Staff.

1. Brown: The Roentgenologist and His Specialty. (*Trans. Amer. Roentgen Ray Society*, p. 232, 1908.)
2. Editorial (*American Quarterly of Roentgenology*, Vol. 1, No. 1, October, 1906).
3. Albers-Schöenberg: Die Roentgentechnik, pp. 293-299.
4. Albers-Schöenberg: The Roentgenologist Is a Medical Specialist, and All Roentgen Plates, etc., Are His Sole Property. (*Archives Roentgen Ray*, Vol. XVII, No. 3, p. 94, August, 1912.)
5. Stover: The Value of the Roentgenographic Examination. (*Trans. Amer. Roentgen Ray Society*, p. 15, 1908.)
6. Stover: The Radiographer's Property Right in the Radiogram. (*Amer. Quarterly of Roentgenology*, Vol. III, No. 2, p. 131, July, 1911.)
7. *Trans. Amer. Roentgen Ray Society*, Vol. II, No. 4, p. 277, 1910.
8. *Verhandl. der deutsch. Roentgen-Gesellschaft*, Band VIII, p. 16.

The position of the radiologist in America is still a matter of individual marksmanship. But the sixteen years which have now given youth to radiology will shortly demand the dignity of manhood or relegate the specialty to a position of toil and secondary importance. Shall the specialty become a mechanical art similar to photography, or shall the radiologist acquire the dignity which the knowledge of correct interpretation of x -ray shadows warrants? The future surely does depend upon the assurance and dignity with which the present day radiologist comports himself.

Another important feature of radiology likewise depends upon the solution of the problem outlined in the preceding paragraph, *i. e.*, the ownership of x -ray negatives and the demand for photographic reproductions by physician and patient. The review of several articles, bearing upon these points, may help to a conservative estimate of future possibilities.

Certain mechanical features of radiology are approximately settled now. The electrical apparatus and photographic processes are no longer matters of extraordinary individual ability; neither do these features de-

mand medical training beyond instruction as to anatomical landmarks indicating standard positions.

Fluoroscopy cannot be included in the mechanical category, for here medical knowledge and special interpretative ability is demanded. But as far as radiography is concerned it may be generally conceded that non-medical ability is all that is necessary.

The most authoritative statement from the radiologist's point of view may be found in the resolutions adopted by the German Roentgen Society in April, 1912, as follow:—

1. Roentgenology is a duly authorized medical specialty, just as are laryngology, ophthalmology, etc.

2. The roentgenologist is a medical specialist, and, as such, in accordance with the usual medical custom, he is called in as a consultant by the patient or his physician, in order to make or to confirm the diagnosis.

3. The roentgenologist makes use of the x -ray examination in addition to the usual clinical examination. He alone decides what particular procedure shall be employed—radiography, radioscopy, orthodiagraphy, or teleoroentgenography.

4. All plates, diapositives, tracings, orthodiagrams, and teleoroentgenograms prepared for the diagnosis of the case are the property of the roentgenologist, just as histological preparations belong to the consulting pathologist. The roentgenologist will, however, as a matter of courtesy, be always ready, if requested, to place his plates and prints at the disposal of the consulting physician.

5. The supply of negatives or prints to sick clubs and insurance companies is a matter of special arrangement. Moreover, in urgent cases it is the usual custom for the roentgenologist to place the skiagram at the disposal of the surgeon.

6. The roentgenologist may at his discretion place a copy of the plate at the disposal of the patient, either gratuitously or on payment of a fee. This should, however, only be done in those cases where it will cause no harm or needless anxiety to the patient.

These preceding resolutions were drawn up by a committee of the society under the chairmanship of Prof. Albers-Schönberg, editor of the *Fortschritte auf dem Gebiete der Roentgen-Strahlen*. They certainly represent a goal beyond the dreams of many, but nevertheless justifiable and reasonable. When we rate the almost menial position upon hospital staffs of some earnest workers in radiology, the contrast is startling.

Prof. Albers-Schönberg maintains the identity of the radiologist as a consulting medical specialist and not as a mere photographer or lay radiographer who happens to possess the necessary apparatus. The arguments he uses to prove his position should be carefully read by all radiologists. To quote:—

"At the present day the status of the roentgenologist as a medical specialist is duly acknowledged in the medical world. The justice of this is self-evident when we reflect on the ordinary routine of a typical radiological consultation and examination. The patient comes to the roentgenologist on his own initiative, or he is sent by the surgeon, or by the family physician. The object of the consultation is the elucidation of doubtful or obscure symptoms and the establishment of correct diagnosis. The roentgenologist examines the patient by all means at his disposal, after having inquired into the clinical symptoms. Should he consider the case a suitable one, he next proceeds to examine the patient by the x -rays, or, on the other hand, he may dismiss him without

Roentgen examination. He may take a roentgenogram, make a radioscopic examination, or use the orthodiagraph, according to circumstances. The decision which, if any, of these methods should be used rests with the roentgenologist alone, neither the patient nor the physician having any voice in the matter. The radiologist then proceeds to give his verdict, basing his diagnosis on the results of his clinical and roentgenological examinations. This he may give to the physician either verbally or in writing, explaining, if necessary, by demonstration of the skiagram or tracing. This completes the work of the roentgenologist and the payment of the fee concludes the business, as in any other medical consultation. The roentgenologist does not sell one or more skiagrams, but receives his honorarium for a scientific opinion of the case."

But such a scheme certainly includes the aim of all consistent radiologists if it does not seem charitable to the mental attainments of non-radiological medical men.

There are certain situations where the negative or print should immediately go to the referring physician. Every railroad or insurance physician should receive a print of each case to be attached to his case records. X-ray negatives become potent factors in the defense of claims for injury and malpractice. But never should a patient receive a print, since it is only demanded out of idle curiosity or as a means of seeking unjustifiable revenge. Its possession may lead to unnecessary anxiety or apprehension. No lay mind comprehends the significance of *x*-ray shadows or their interpretation. We see so many good functional results in cases which present almost unbelievable anatomical distortion, that many lawsuits have developed entirely upon *x*-ray evidence in the hands of unscrupulous attorneys.

The *x*-ray negative may be compared to the microscopical slide. Their true meaning is only comprehended by the intelligent interpretation of shadow and cell. And does the patient ever demand the slide which displayed the germ or the suspicious tissue? True, every radiologist should carefully file the negatives of all cases for future reference, and they should be at the disposal of the patient if he changes his physician or wishes to compare them with another radiologist's record of his case.

Again, in acute traumatic surgery, the negatives should be immediately available to the surgeon because of the failure of the surgeon to grasp the radiologist's interpretation or the radiologist's scanty knowledge of descriptive surgical terms.

There can be no doubt but that the constant communion with *x*-ray shadows affords the radiologist an abundance of interpretative knowledge. But the teaching of interpretation is going to give the present-day student a great advantage in the future. It is only the obscure cases which will create the demand for anything more than the negative. Therefore, will some not seek to buy their negatives at the cheapest shop producing passable *x*-ray negatives and reserve only the few unusual cases for the efficient radiologist? Such arrangements will so lessen the demand for pure radiologists as to minimize the attractions of the specialty and thereby lessen the chances of future development. The present day seems to provide enormous problems for radiology, but may this not be due to the inability of the majority of the practising profession to interpret shadows correctly? Will not the efficiency of medical education more or less provide against just this feature?

It seems hardly probable that the lay radiographer would zealously

guard his negatives, for he would lack the principles of ethical radiologists. The commercial instinct which created his work precludes any professional attitude toward ethics.

The only edict regarding the ownership of negatives in America came from a meeting of the American Roentgen Ray Society held in 1910. It was maintained that the radiologist retains the ownership of the x -ray plate on the ground that it is an integral part of the documents of the case. This resolution was presented by Pancoast, of Philadelphia, and adopted as follows: "RESOLVED: That the American Roentgen Ray Society endorses the views presented in Dr. Stover's paper, vesting a property right in the radiogram, with the radiographer, inasmuch as the radiogram is a part of his clinical record of examination."

The x -ray plate, similar to the microscopical slide, does not tell the story—it only furnishes the means by which the radiologist arrives at his diagnostic opinion. And likewise may we reason that the position of the radiologist and pathologist is parallel. The pathologist becomes merely a routinist who only prepares slides for the convenience of the surgeon and internist. Such methods rapidly dampen the ardor for research which the college days implant in the student's mind. We can hire girls and mechanics to prepare slides and section tissue, but surely the absorption of the pathologist's interpretative knowledge into the internist's routine will preclude future developments—and surely the profession to-day is widening the knowledge bequeathed them by pioneer pathologists. It would seem that a vicious circle might develop within the profession to the detriment of future diagnostic efficiency.

An editorial in the *American Quarterly of Roentgenology* suggests an attitude which would combine self-respect and the respect of the profession. To quote: "It is time that the experts in the science of roentgenology demand for their work the recognition which is due them. To receive this respect it is necessary for the roentgenologist to preserve a proper dignity in referring to his diagnostic work. He should be careful in his nomenclature, preferring such terms as roentgenogram, diagnostic plate, etc. He should in general let the profession and laity understand that the fee for his services is based upon the diagnostic conclusions which he reaches. He should maintain in his own hands his roentgenogram, delivering simply the diagnosis. He should avoid arguing with the laity concerning interpretations of his records of density. In other words, he should maintain always the position of consultant who gives diagnostic conclusions based upon special lines of investigation. In regard to treatment, he should not allow himself to be dictated to, either as to the number or to the character of his treatments by the attending physician. He should give the profession and the patient to understand that all the details of Roentgen therapeutics are guided by his judgment and experience."

Stover uses his characteristic language in describing his position upon this subject. "The examination by the radiologist is, I take it, a consultation with one who bases his opinion upon his examination made by means with which he is specially familiar. The hematologist bases his opinion upon examinations made by means of chemicals, and so on. The patient should not be sent to the radiologist for a picture; he should be referred to the radiologist for his opinion. The patient should not be led to believe that he is going to get a picture or a print, and in many cases it is unfortunate if he should obtain such, or even see the negative made by the radiologist. Some impressionable patients may take up an

autosuggestion which, while unfounded upon good reason, yet may work them much mental harm, as well as reacting unfavorably upon the medical or surgical attendant. Another thing, the negative which the radiologist makes is his property. The microscopist does not give the lens he has used to the patient by whom he has been consulted, neither does the chemist present the contents of his laboratory to the individual whose urine or gastric contents he has been investigating by chemical means.

"I should like to say further that I do not believe that skiagrams ought to be exhibited to juries; the members of a jury are not capable of reading a skiagram; the radiologist always has to explain it to them, and the exhibition of a skiagram to a jury, I believe, leads the members of the jury to give the skiagram a weight which it often does not deserve, as compared to other parts of the evidence, simply because as a general proposition visual impressions are more powerful than auditory ones. But this is a digression.

"The radiologist should render his opinion to the physician who has referred the case, either verbally or in writing, or better still, by demonstrating from his skiagram.

"The radiologist should, at the time of making the examination, take notes setting forth the important features to be remembered, the date, name of patient, name of physician referring the case, part examined, condition examined for, and condition found. When the skiagram has served its immediate purpose, it should, properly marked for identification, be filed away in a safe place for preservation."

Stover sums up his opinions upon the property right of radiograms as follow: "The transaction between the roentgenologist and the patient has for its actual object the furnishing of a scientific opinion by the roentgenologist. The skiagram contains only a part of the information upon which the opinion is based. The skiagram is a part of the roentgenologist's record of his study of the patient's case. The interest of the patient in so far as it appertains to the skiagraphic record will be better conserved with the skiagram in the hands of the scientist who understands it and appreciates it and who has a proper means of preserving it, than in the hands of the patient to whom it is a mere temporary curiosity. The value of the skiagram to the patient, as a mere object of curiosity, is greatly overbalanced by its value in the hands of the roentgenologist as a scientific record to be preserved and studied, and to be used for the further advancement of the science of healing."

Among the European universities we note x -ray laboratories attached to individual medical or surgical clinics. For instance, at the Charité in Berlin, there is an x -ray installation in two medical clinics, the surgical clinic, the orthopedic clinic, the eye and ear department, the skin department, and others. Other institutions have a large, complete x -ray department, sometimes in a separate building, *e. g.*, the St. George Krankenhaus at Berlin, the Hospital St. Antoine in Paris, and many other splendid examples. Now each of these methods of conducting x -ray work has its influence and champions. Prof. Albers-Schönberg devotes several pages in his textbook to arguments in favor of the centralization of x -ray effort in any institution, as this promotes the efficiency and completeness of all examinations and lessens the expense.

The work is then sufficient to demand the entire time of a director who shall see that routine work is properly expedited and research efforts planned. There has been far more work of lasting benefit to the profession and the specialty from the centralized x -ray laboratory than

otherwise. The simple installation in any one clinic does not receive the concentrated efforts of any one man; and the failure to keep the apparatus up to its normal efficiency finds it gradually going into disuse or its value underrated.

There have been many American physicians, not radiologists, who have witnessed such use of small installations; and, provided they were working satisfactorily, have come away enthusiastic with the idea of establishing an *x*-ray installation (especially the fluoroscope) in their private offices at home. But when such visits were at a time when the clinic installation was temporarily out of order or the assistants only partially familiar with its advantages, the impression failed to arouse even the slightest interest in the ray.

It can hardly come to pass that the surgeon or physician will be able to provide satisfactory *x*-ray examinations in his individual laboratory and maintain his equipment at its normal efficiency. The time required to conduct the examinations thoroughly, especially fluoroscopic, are healthy arguments against such practice. Sooner or later he will fail to obtain results, and his installation will fall either into disrepute or disuse. The manifold duties of increasing practice will also cause him to avoid the *x*-ray examinations, because of lack of time and failure to keep abreast of radiological work.

It seems, therefore, that radiology demands the services of specialists who will maintain an efficient physical equipment and possess a brain alert to the increasing knowledge constantly being placed at their disposal. The surgeon can never hope to be able to interpret fluoroscopic shadows with the same exhaustive interest that the radiologist will bestow upon individual cases. As soon as the profession is able to judge between the radiologist with intelligent interpretation and the mere possessor of an *x*-ray apparatus, just so soon will the dignity of radiology be firmly established. There seems little doubt but that many of the leaders of medical thought have estimated radiology at its true value, but it will take time to educate the rank and file. We must realize that the study of radiology is still in its youth, and that many false steps must be credited to it in the earlier years, which, while not resulting in permanent deformity, at least have hindered legitimate growth.

We may safely estimate that the future depends upon the conservatism and sanity with which the ethical radiologist of to-day conducts himself and his laboratory.

CONGENITAL DISLOCATION OF THE HIP AND CONGENITAL CLUB-FOOT.

A REVIEW OF RECENT LITERATURE.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Redard: The Late Results in Reduction of Congenital Dislocation of the Hip. (*Zeitschr. fuer orth. Chir.*, Bd. XXX, Hft. 1 and 2, 1912.)
2. Landwehr: Observations upon Anatomy of Congenital Dislocation of the Hip. (*Zeitschr. fuer orth. Chir.*, Bd. XXX, Hft. 1 and 2, 1912.)
3. Hayashi and Matsuoka: Anatomical and Radiographic Investigations of the Bony Structures Concerned in Congenital Dislocation of the Hip. (*Zeitschr. fuer orth. Chir.*, Bd. XXX, Hft. 1 and 2, 1912.)
4. Springer: Cystitis Following Reduction of Congenital Dislocation of the Hip. (*Zeitschr. fuer orth. Chir.*, Bd. XXX, Hft. 1 and 2, 1912.)
5. Lorenz: A Rare Complication Following Many Years After a Lorenz Operation for Congenital Hip Dislocation. (*Archiv. fuer orth. mech. und unf. Chir.*, Vol. XI, Hft. 4.)
6. Savariand: Congenital Club-Foot and Its Treatment. (*La Presse Méd.*, September 7th, 1912.)
7. Frœlich: Treatment of Congenital Club-Foot. (*Rev. d'orth.*, March, 1912.)

Redard gives a report of the late results in 1000 cases of congenital dislocation of the hip. In single cases the percentage of cure was from 85 to 90 per cent.; where the operation was done before the fourth year, in double cases, it was 30 per cent. He finds that it takes many years after reduction for the hip-joint to become normal, but that it finally returns to a close approximation of the normal. There are, however, late appearing deformities of the head and neck, which are apparently due to osteomalacia. Redard believes in early reduction and the avoidance of injury at the time of reduction, and in cutting down the fixation after operation to the minimum. He also suggests that the child should not walk until the hip is practically in a normal position.

The work of Landwehr is confined to a consideration of the anatomy of several specimens, and he concludes that the dislocation is not one due to congenital malformation of the pelvis, or femur, but is the result of certain movements, or positions, of the femur in intra-uterine life, which cause a flattening of the posterior rim of the acetabulum.

Hayashi and Matsuoka suggest that the principal cause of congenital dislocation is an anatomical change in the head of the femur and the acetabulum, secondary to intra-uterine pressure. They arrive at this

conclusion after considering the various theories of etiology and the reports of post-mortem findings.

Springer reports 5 cases in which cystitis occurred after a manual reduction of the dislocation, caused probably by the flexed abducted position.

In the case reported by Lorenz, the hip suddenly re-dislocated after being in place for five years. This re-dislocation was caused by the change in the upper end of the femur and the size of the acetabulum. Reduction was easily accomplished by abducting the leg, and re-dislocation was easily reproduced by abduction. After six weeks of strong inward rotation, followed by six months of active gymnastics, the condition no longer appeared. He states that only 3.75 per cent. of cases have resulted in coxa vara, which is in contradiction to Lorenz's statement that 48 per cent. of the cases developed this condition.

Savariand believes that club-foot is the result of faulty attitude; and that, depending on the duration of this faulty attitude in intra-uterine life, the deformity is more or less severe. He believes that the tendency to recurrence after correction is due to the cartilaginous condition of the bones in the tarsus, and he strongly recommends Ogston's operation.

Fröelich believes that all appliances should be banished from the treatment of club-foot in infancy; that cases under six months are all amenable to a method of treatment which comprises manual correction without anesthesia and retention of the foot in a single band of adhesive plaster that encircles the foot and passes up the outer side of the leg over the flexed knee, the upper end of which must be readjusted several times a day. If this is carefully done for three weeks in favorable cases, the foot will remain corrected, and in older cases it is necessary to use force, under anesthesia. The author gives minute directions as to how this correction should be carried out.

BONE TRANSPLANTATION AND THE REGENERATION OF BONE.

A REVIEW OF RECENT LITERATURE.

By MALVERN B. CLOPTON, M. D., of the Editorial Staff.

1. Læwen: The Histological Study of Transplanted Periosteal Covered Bone in Man. (*Archiv fuer klin. Chir.*, Bd. 90, p. 469, 1910.)
2. Axhausen: The Histological and Clinical Findings in Osteoplastic Experiments. (*Archiv fuer klin. Chir.*, Bd. 88, p. 23, 1909.)
3. Axhausen: Bone Pathology and Surgery. (*V. Langenbeck's Archiv*, Bd. 94, Hft. 2, 1912.)
4. Baschkirzew and Petrow: Free Bone Transplantation. (*Deutsch. Zeitschr. fuer Chir.*, Bd. 113, Hft. 5 and 6, p. 532, 1912.)
5. Macewen: Growth of Bone. 1912.
6. McWilliams: A Discussion of Bone Transplantation and the Use of a Rib as a Graft. (*Ann. Surg.*, Vol. LVI, p. 377, 1912.)
7. Murphy: Surgery of Bones. (*Journ. Amer. Med. Assoc.*, Vol. LVIII, p. 989, 1912.)
8. Carter (*Med. Record*, December 9th, 1911).

This question of bone transplantation was reviewed in the JOURNAL some years back, but since that time much new material has come to hand dealing with this question and the question of the regeneration of bone.

Some of the observers have made careful histological examinations of the transplant after various periods of healing. Læwen studied the bone that had been transplanted for seventy-eight days, and found by injecting the vessels of the amputated arm that there was a complete vascularization of the piece of tibia that had been implanted. The transplant had died and was being gradually absorbed and replaced by new bone which grew from the bone cells of the Haversian canals; and at no place could he find any of the implanted bone that stained normal for living tissue. The new bone took the form of the tissue it replaced; and the periosteum lived and was active in developing the new bone which lay between the periosteum and the dead graft. The cells of the medulla were also active in the formation of new bone. These views coincide with those expressed by Ollier over fifty years ago and conform to the views of Axhausen. The latter, after extensive experimentation and considerable experience with humans, believes that the best transplant is a live piece of bone with the periosteum and some bone-marrow. The periosteum which is freed from attached muscles is incised in various places to allow freer proliferation. The bone is best taken from the same individual, or if this is impossible, from another in-

dividual, but never from an animal, because its replacement is delayed and the periosteum does not proliferate. The experiments of Baschkirzew and Petrow with animals make them believe that transplants without periosteum are as efficient as when the periosteum is retained, and that regeneration comes irrespective of the periosteum or bone-marrow. They believe that the primary layer of granulation tissue which surrounds the transplant is the chief source of regeneration of bone, which metaplastic formation of bone is due to the irritation of the gradually dying bone. They also believe that, despite the partial necrosis of the periosteum which they have observed, the periosteum still has a useful function, and in making transplants the periosteum should be preserved.

Macewen, however, was first responsible for the pronounced stand that the periosteum had no part in the formation of bone, and that it was only a limiting membrane. This radical teaching has been very clearly developed in the series of experiments that form the basis of his book. He believes that all diaphyseal bone is reproduced from the proliferation of osteoblasts derived from pre-existing osseous tissue, and that this takes place independently of the periosteum. To his mind the periosteum has no osteogenetic power. His experiments cover many phases of bone transplantation and are certainly convincing. McWilliams has accepted Macewen's idea and has inserted parts of ribs denuded of periosteum with apparent healing. He has also carried out experiments on animals that are intended to show that the development of new bone comes from the bone cells and not from the periosteum. Murphy believes that periosteum should be on the transplant which acts as a scaffolding for the reproduction of new bone of the same size and shape, the transplant being ultimately absorbed. The graft is not osteogenetic, but osteoconductive. The rôle of the transplant is to give mechanical support to the capillaries and blood-vessels with their osteogenetic cells as they advance from the living bone at both ends of the transplanted fragment into the Haversian canal, canaliculi, and lacunæ of the transplant. The periosteum attached to the transplant, if the graft is taken from young people, has a positive osteogenetic influence; in the middle-aged it is neutral, in those of advanced years it plays a negative rôle and is detrimental.

The indications for transplanting bone are (*a*) to correct deformities resulting from developmental defects such as aplastic radius, ulna, humerus, etc.; (*b*) to produce union in ununited fractures; (*c*) to replace bone removed by destructive infections, osteomyelitis, tuberculosis, lues; (*d*) to restore or supplant fragments dislodged or destroyed by fractures, as the head of the humerus, head of the femur, shaft of the tibia; (*e*) to replace bone removed for non-malignant or encapsulated malignant neoplasms.

Carter has transplanted a rib, without the periosteum and the medulla scraped away, into a pouch of skin over the nose, and has had uniformly good results in the 9 cases operated upon.

DIAGNOSTIC AND THERAPEUTIC NOTES.

DRUG TREATMENT OF EDEMA.—Miller (*Amer. Journ. Med. Sciences*, July, 1912). In an address before the Association of American Physicians, Miller reported his observations on the medicinal treatment of the edema of nephritis. Digitalis, strophanthin, theophyllin and Fisher's solution were used. In 8 cases of chronic interstitial nephritis with broken cardiac compensation, digitalis preparations caused marked diuresis only in one instance, though dyspnea was considerably relieved. Theophyllin, on the other hand, given in capsules in doses of 0.25 gm. daily, gave good results, only one case failing to react to it. Diuresis was marked within twelve to eighteen hours, reached its maximum generally within forty-eight hours, and continued until the drug was stopped on account of nausea or until edema had largely gone. Where dyspnea was present, it was only moderately relieved. Intravenous injections of strophanthin, 0.75 mgrm. at a dose, were given in 10 cases. After one injection only a very moderate diuresis developed, but this continued for several days, the edema meanwhile gradually decreasing. Dyspnea was greatly lessened. In several instances, by repeating the injection about once a week, the patient was kept reasonably comfortable when other forms of treatment, such as sweats, laxatives, and digitalis had failed to give even temporary relief.

A case of acute nephritis with edema reacted well to theophyllin, but of 4 cases of acute exacerbation of chronic parenchymatous nephritis only one showed diuresis, even after several days' use of the drug. Digitalis, strophanthin, alkaline diuretics, and Fisher's solution (prepared by dissolving 8 gm. of crystalline sodium carbonate and 15 gm. of sodium chloride in one litre of water) were tried in these patients, but had little or no influence on the urinary excretion. Miller concludes that failure of the kidneys to react to theophyllin indicates a very grave disturbance, as the 4 patients with chronic parenchymatous nephritis, in whom it proved ineffectual, all died within two weeks.

TREATMENT OF HEMORRHAGE.—Clowes and Busch (*New York Med. Journ.*, January 4th, 1913). The value of blood-serum injections in the treatment of hemorrhage seems well established. The writers have experimented with blood-serum precipitated by a mixture of acetone and ether, and have found it fully as effective as fresh serum, if not superior to it. Precipitated serum is freely soluble and possesses the advantage over fluid serum of being sterile, always available, and retaining indefinitely its capacity to stimulate coagulation of the blood. The product obtained from horse serum appears to yield more uniformly satisfactory results than that obtained from the sera of other animals, and exerts

no deleterious effect. The determination of the rapidity with which sera and solutions of precipitated sera, at comparable concentrations, cause coagulation of citrated blood-plasma affords a simple means of estimating the relative activity of the preparations in question, and consequently of standardizing precipitated sera for clinical purposes.

WHISPER PECTORILOQUY.—Rist (*La Presse Méd.*, September 4th, 1912). Listening over the lungs, while the patient counts in a whisper, is one of the most useful procedures in the examination of the lungs. A marked accentuation of the whisper over a circumscribed area may be considered the equivalent of bronchial breathing and bronchophony. It is, however, more easily recognized than these in certain doubtful cases, *e. g.*, where bronchial breathing reaches the ear in admixture with the normal vesicular murmur, where it resembles the so-called 'harsh' respiration, or where its place of origin is deeply situated, as in the case of certain cavities, interlobar pleurisy, or central pneumonia. In these difficult cases bronchophony is likewise almost useless, being too loud and without differences of shading. Whispering pectoriloquy, on the other hand, allows of diagnosing the physical condition underlying bronchial breathing, *viz.*, consolidation, partial or complete, with great delicacy and precision. Care should obviously be taken to exclude direct transmission of the whispered voice to the ear through the air. It is also to be remembered that when listened for over areas normally yielding bronchial breathing, whispering pectoriloquy is without significance. Curiously, it is precisely in the two conditions in which it was formerly asserted to be pathognomonic, *viz.*, serofibrinous pleurisy and involvement of the peribronchial glands, that the sign is untrustworthy or valueless.

OXYGEN REPLACEMENT IN PLEURAL EFFUSION.—Davies (*Lancet*, December 28th, 1912). In large pleuritic effusions, it is not safe, by the ordinary methods, to aspirate more than a small fraction of the fluid on account of the great change in intrathoracic pressure involved. The author suggests that this danger can be obviated and all or nearly all of the fluid withdrawn, if the latter is replaced by some non-irritating sterile substitute. The ideal substance for this purpose is oxygen, on account of the rapidity with which it is absorbed. Under local anesthesia a needle connected with an aspirating apparatus is introduced into the fluid in the eighth intercostal space in the midaxillary line, and a needle connected with an oxygen apparatus is introduced in the fifth intercostal space in the same line. When the needles have been introduced it is absolutely essential that a manometer connected with the upper needle should show respiratory movements, and until these movements are obtained no oxygen must be allowed to escape through the needle. Fluid is now aspirated from the chest and the aspiration is continued until the patient either coughs or experiences the slightest pain. The aspiration is then immediately stopped, and 50 to 100 c.cm. of oxygen are allowed to run in slowly. The pain or cough will at once disappear, and the aspiration is continued until the recurrence of some symptom demands the intro-

duction of more oxygen. This process is continued until no more fluid can be withdrawn. Toward the end of the process, oxygen will be found to escape with the fluid, and the proportion of oxygen introduced to fluid withdrawn must be increased.

DIAGNOSTIC PITFALLS.—Cabot (*Journ. Amer. Med. Assoc.*, December 28th, 1912). By comparing the ante-mortem and post-mortem diagnoses in a series of three thousand autopsies, Cabot was able to tabulate the most frequent errors in diagnosis. The following deserve special mention:—

Acute gastritis is a rare disease in adults; appendicitis or gall-stones is the correct diagnosis in most cases. Chronic indigestion is usually a mistaken diagnosis, the actual condition being peptic ulcer, pulmonary tuberculosis, constipation, or cancer of the colon. Bronchitis usually proves to be phthisis, bronchiectasis or bronchopneumonia. Asthenia after middle life is usually symptomatic of cardiac or renal disease. Unresolved pneumonia often turns out to be interlobar empyema. Malaria is often given as a diagnosis in cases of phthisis, hepatic syphilis, hepatic abscess, and urinary infections. Rheumatism is the most dangerous of all diagnoses to make; it may prove at autopsy to be aortic aneurysm, cancer of the pleura, tabes, osteomyelitis, spondylitis deformans, bone tuberculosis, syphilitic periostitis, lead poisoning, morphine habit, alcoholic neuritis, or gonorrheal infection. Cystitis is practically always a symptom secondary to stricture, prostate, or renal tuberculosis, and not a disease. The failures represent the success and failure ratio of certain methods rather than of certain men. Acute uremia was never found to be a correct diagnosis; other well-recognized causes of death were found at autopsy.

GALL-BLADDER PAIN AS AN EARLY SIGN OF TYPHOID FEVER.—Radulesco and Atanassin (*La Presse Méd.*, November 30th, 1912). The writers have found tenderness to pressure over the gall-bladder region constantly present in typhoid fever. The liver should be pushed forward by one hand inserted beneath the patient, while the other hand exerts deep pressure in the region of the gall-bladder. This tenderness was observed in every one of a series of 47 cases of beginning typhoid fever, and occurs earlier in the disease than all other signs hitherto described. It is almost always present at the height of the affection, and always disappears during convalescence. It was also found positive in cases of failure of cardiac compensation, in right-sided pneumonia and pleurisy, and in puerperal sepsis; but in these cases the pain caused is due to abnormal sensibility in the entire liver instead of in the gall-bladder area alone. Disappearance of the sign in typhoid fever always indicates that recovery is about to take place; where it persists, a relapse is to be feared. Where it returns after having already disappeared, a relapse may be unhesitatingly predicted, even though there is as yet no clinical indication of it.

CORRESPONDENCE

PARIS LETTER.

HUMAN MORPHOLOGY AND PHYSICAL CULTURE.

By AUGUSTE A. HOUSQUAINS, M. D.

If we study the morphology of each human being we can, if we follow M. Sigaud's teachings, evolve four principal types, doubtless slightly schematic but nevertheless clearly characterized. The principal features of each of these types, succinctly reported, follow. M. Sigaud envisages at first the respiratory type, and the result is that he recognizes two principal characteristics: (1) the length of the trunk and (2) the enlargement of the nasomalar zone. In this type the face assumes a characteristic lozenge-shaped aspect, and as regards the general appearance of the body, it presents a notable disproportion between the length of the trunk and that of the extremities, the length of the trunk being more evident in the thoracic development than in the abdominal, since the latter is in the normal state of smaller dimension than the former. The emaciated hips are in apposition with the iliac crests and the space containing the abdominal viscera is of small dimension.

The next type is the digestive. Similar to the preceding it is characterized by the increased length of the trunk, but in this type the abdominal part of the trunk is the most developed, the mass of abdominal viscera crowding against the thorax. The facial expression presents characteristic traits: the mouth is enlarged, the lips are thickened, the lower jaw is enlarged, the forehead is high, and in its general appearance the head presents, as it were, the aspects of a pointed cone, the base of which corresponds with a line drawn through the lower jaw.

In the muscular type, the extremities are elongated and massive, and the muscular masses stand out in strong relief. The trunk is rectangular; the head, generally of small dimensions, rests on a neck which is very much enlarged.

Finally, in the cerebral type, the head is very much enlarged, the greatest enlargement being at the top. The outlines of the forehead are rounded, the mouth is small, the inferior maxillary pointed. In its general appearance the head somewhat resembles a cone, with the point on a level with the lower jaw. Moreover, the figure is short, the trunk narrow, the extremities emaciated, and the muscles undeveloped.

It should be stated here that these morphological types cannot always be clearly outlined; hence, there are intermediary types. MM. Sigaud and Vincent, in their book on "The Origin of Disease," have thoroughly studied the conditions in which the differentiation of the divers morpho-

logical types takes place. They are of the opinion that the influences of environment, heredity and education should be taken into consideration. The influence of environment seems to preponderate. The four principal elements which react on the organism are the atmospheric, which reacts on the respiratory apparatus; the alimentary element which influences the digestive type; the physical element which influences the muscular type; and finally the social element which influences the function and development of the brain. If one of these elements predominates, the morphological type which will result will be more or less characteristic, that is to say, the digestive type develops in the fertile regions where alimentary products exist in a state of abundance. On the contrary, in places where the fight for existence is most intense, and where the natural obstacles necessitate the organism to react, the muscular type will be more frequent. High altitude will develop the respiratory type, and finally, in the congested districts in cities where the nervous factor of an organism is continually over-excited, the cerebral type is most frequent.

In case any one of these types is reproduced as the result of heredity, the person who inherits a type will show a further development if he lives in the same place and under the same influences as his parent. Since the person who has a certain type cannot escape the ancestral influence, or the influence of the environment in which he lives, it is best for him to live the sort of life which will develop and utilize to the best purpose the morphological qualities inherent to his nature. Here a delicate question confronts us: Would it be better, through education, to develop the elements which have created in a person a morphological type, or, on the contrary, would it be better to force a development of those other elements so that an equilibrium could be established between the divers morphological types? According to M. Sigaud the answer admits of no doubt, for he advances that the greater the asymmetry, the more the organism appears to resist and to be unable to adapt itself to divers environments; in other words, it is with difficulty that the organism can find the amount of the necessary excitement which would best develop the full growth of all its functions.

M. Sigaud is also of the opinion that persons with types which can be clearly outlined are superior to those in whom the types merge into each other, for he contends that in the human economy it is best for one type to predominate and the other types to have a secondary value that is contributory to the harmony of the whole.

Is it possible to deduce from his theory any practical conclusions? A deduction is not impossible; and it would appear from what we know of the subject to-day that its future development will accentuate its importance as a serious study.

The bringing up of children, the development of physical culture, and even the development of intellectual culture will be truly scientific only when the day arrives where for each individual we shall be able to understand the morphological factors which characterize him, and then apply them to such pedagogical rules in the matter of his education that will benefit him most.

It is interesting to remark that in the first years of existence, the child passes through four successive phases, of which each corresponds to the morphological make-up of one of the apparatus of the organism. In the course of each of these periods each apparatus adapts itself functionally to its corresponding environment. The first two periods which are, so to say, confounded, correspond to the development of the respiratory apparatus and the digestive apparatus, and up to the tenth

year these two apparatus have a predominant functional rôle; then appears the muscular period, in the course of which the extremities rapidly develop simultaneously in length, muscular growth and functional activity. Later appears the fourth period, which is the longest period, and this corresponds to cerebral development.

Does not all this prove the necessity of applying a special educational method to each period in the existence of a child?

MM. Sigaud and Vincent particularly emphasize this necessity, and following them it is absolutely necessary for us, during the formation of an apparatus, to preoccupy ourselves with all those causes which might give the proper stimulation to the full development of this apparatus. Up to eight or ten years, outdoor life and alimentation ought to be encouraged; in the following period the muscular system ought to be the object of our particular solicitude. At this period, physical education should be prosecuted in a methodical fashion. Finally, from ten to fifteen years, we should apply ourselves to the development of the cerebral functions, at the same time studying the individual aptitudes.

If we would strictly observe these rules, which appear at sight very simple but which in reality demand our closest attention and preoccupation in every case, we will note the progressive picture of the morphological characteristics which dominate individuals, and from these observations the educator will be in a position to abet the activity of the organism in the direction indicated by the principal morphological characteristics. In other words, he will develop each organism to its fullest extent without opposing the tendencies which, left to themselves, would have developed the morphological characteristics in a natural manner. We cannot insist too much on the danger of applying uniform rules to the education of the child, as well as to its physical and intellectual development. It is no exaggeration to say that each child requires a particular method of education. And this will be accomplished only when the collaboration of the educator and the physician is at last realized, for then it will be easy to arrange the proper studies based on the morphological characteristics of each child. Each of these groups characterized by an ensemble of differentiated morphological traits will then have an appropriate method, not only for its intellectual formation but for its physical development and even for its alimentation.

Everyone who has had the occasion to come in contact with our present methods of education has been able to note the vast differences which often obtain with children in connection with the same studies and the same occupations. Certain children follow certain intellectual occupations with ease, and even with pleasure, while others of the same age, and even of the same physical stature and apparent resistance, are incapable of making the necessary effort to acquire similar studies. Likewise, certain physical exercises make certain children stronger and happier, while on the other hand these same exercises cause their comrades to be depressed and weak.

If it is logical to apply the idea furnished by the science of morphology to the development of young subjects, it is well to remember that these ideas should not be applied only to the development of young organisms. Adults also could derive an appreciable benefit from a more thorough knowledge of the morphological characteristics which correspond to the functional aptitudes. Thus, at the present time, morphology is studied in France when recruiting soldiers; a laboratory for its study has been created by the Minister of War so as to establish a proper selection and to realize a saner placing of soldiers in the various regiments. The ap-

plication of morphological ideas in the rearrangement of the army will cause a revision and classification of recruits, which will no doubt render the greatest service to the country; for then each individual will definitely realize the full development of his aptitudes when placed in those conditions which are favorable to their development.

This systemization is still in an embryonic state. The military surgeons should study the importance of morphological studies so that they can be in a better position to diagnose the different physical types to the end of arriving at a proper rearrangement of the men, in a rational fashion, according to their diverse aptitudes. Only in this way will they obtain a better knowledge of the aptitudes of each soldier and even utilize those soldiers who are to-day turned down.

Since morphology and the practical deductions which are derived from this science affect not only children but adults, it would seem that its further application will, before long, play a considerable rôle in the utilization of our values and the development of the human race.

January 10th.

LONDON LETTER.

THE NATIONAL INSURANCE ACT.

By KENNETH W. MILLICAN, B. A. Camb., M. R. C. S.

In my article published in the December number of the JOURNAL the readers were made aware of the refusal, November 19th-21st, of the British Medical Association to take service under the Act. The figures were as follow:—

	For service	Against service
Members of British Medical Association....	1963	9331
Non-members.	445	1888
	<hr/> 2408	<hr/> 11219

The majority against was thus 8811 or about five to one. These represent the numbers of votes cast in the Divisions of the Association. The voting of the representatives was for service, 21; against, 182. It is significant that the large preponderance against existed also among non-members of the Association, showing that it was due to an essentially professional feeling.

The smallness of the total vote—13,627 out of approximately 29,000 theoretically available medical men was variously explained. Indifference would account for a certain proportion of the remainder. The difficulty of being present at a fixed hour and place doubtless accounted for many non-voters. The remaining factor was probably the certain knowledge of an assured majority against service, leading many who had already made up their minds for or against service to abstain. Each side, of

course, assumed that the majority vote among the non-voters would, if it had been cast, have been in their favor.

The subsequent course of events can be rapidly sketched. The association put forward an alternative scheme on which it was willing to treat insured persons—each insured person to have free choice of doctor, subject to doctor's willingness to act; a capitation fee to be \$2.10 per annum inclusive of drugs; where payment by attendance is agreed on the total available sum at the above capitation rate to be 'pooled' in the hands of a local medical committee who should pay the bills therewith at a scale to be previously fixed by the medical committee; that the arrangements be made, not with the Local Insurance Committees under the Act, but directly with "the insured or their representatives"; that all other details be left to be arranged between the profession locally and the insured or their representatives. It was held that this course was feasible under the Act on what has become known as the 'contracting out' plan. Subsection 15:3 states: "The regulations made by the Insurance Commissioners *shall* authorize the Insurance Committee by which medical benefit is administered to *require* any person whose income exceeds a limit to be fixed by the Committee, and to *allow* any other persons, in lieu of receiving medical benefit under such arrangements as aforesaid, to *make their own arrangements* for receiving medical attendance and treatment (including medicines and appliances), and in such case the Committee *shall*, subject to the regulations, contribute from the funds out of which medical benefit is payable towards the cost of medical attendance and treatment (including medicines and appliances) for such persons sums not exceeding in the aggregate the amounts which the Committee would otherwise have expended in providing medical benefit for them." (*Italics inserted.*)

Those refusing service held that this section gave all the insured the right to claim to make their own arrangements, provided the Committees were willing, as they clearly had the power, to exercise their discretion and allow this course. If such an arrangement had been accepted there can be little doubt that the Act would have been willingly worked by the entire medical profession for a trial period until it was possible to see clearly in what directions it would be necessary to amend it.

But Mr. Lloyd George is nothing if not autocratic. He would brook no interference with his plans. So on December 23rd the Insurance Commissioners promptly issued a memorandum that the government would not accede to any such proposals in regard to medical benefit, which would involve the expenditure of public money without adequate public control; and that they could not sanction any arrangements which conflicted with this fundamental principle. They at once set about forming the panels of medical men under the Act.

Meantime, Mr. Lloyd George's lieutenant, Dr. Christopher Addison, M. P., with Sir Victor Horsley, wrote letters in which they accused the Association of having departed from one of its six cardinal points—namely, freedom from friendly society control, in that they now expressed the determination to accept such control by treating directly with the insured and their representatives (that is, the Societies). This, of course, was insincere, because it is obvious that a collective bargain between the local profession and the societies, which must be assented to before any medical man accepted service is not control at all. It is an altogether different thing to individual men accepting service first

and trying to arrange terms afterwards with bodies in which their opponents have a statutory permanent majority.

Conferences of the profession were held all over the country to decide whether doctors should join the panels, as invited by the Commissioners or not, the last date being fixed for December 31st when the panels were to be closed for the first list. Any practitioner, of course, might join subsequently; but it was pointed out that as the lists would be closed on the date named, if he joined afterwards his name could not appear on that panel and others would get ahead of him in securing insured as patients. The papers were also filled with discussions for and against the right of individuals to consider the pledge against service cancelled—those who argued in favor thereof taking their stand on the discredited claim that the Association had itself gone back on, at least, one of its six points. For several days there was an enormous preponderance throughout London and the Provinces in favor of refusing to serve in accordance with the pledge. Scotland and Wales were more inclined to serve, with the exception of one or two localized areas, holding that the profession had succeeded in getting all it was likely to get. Mr. Lloyd George was announced to make a speech to the Advisory Committee on January 2nd, and the idea got abroad that the apparent impossibility of forming any panels would lead him to make important concessions. Consequently, on December 29th, the Insurance Commissioners issued an authoritative statement that positively no concessions would be made. By December 28th, in the metropolitan area, 25 districts had refused to form panels, 6 had consented and 2 were doubtful. In the provinces 41 had refused, 27 had consented and 7 were wavering. It was then officially announced that instead of the lists being closed on December 31st, they would remain open until January 4th, which was subsequently extended to January 6th.

On December 31st a meeting of doctors who had consented to work the Act in London north of the Thames, and on January 1st a similar meeting of those willing on the south side was called. They were attended by 231 and 217 doctors respectively, not all of them, however, being those who had accepted; for many, in spite of the secrecy maintained as to time and place of meeting and the limitation of admission to ticket holders, succeeded in getting admittance. The poverty of the support was thus made manifest. These meetings appointed a joint medical committee, and accepted the capitation basis of payment for all areas in the County of London.

Then came Mr. Lloyd George's address to the Advisory Committee on January 2nd, outlining the course that would be adopted in cases where no adequate panel of doctors willing to serve could be formed. Briefly, his methods were these: (1) Those doctors who had consented to serve might pledge themselves to take a sufficient number of assistants or partners to cover the ground, the panels being closed so that those doctors might secure the whole of the Insurance practice; (2) new men would be sent down by the Commissioners willing to work the Act, to start practice on their own account in the Area, the panels being closed for one, two, or three years, as might be arranged, to enable them to make good their footing; (3) a salaried service of men at \$2,500.00 a year each, with permission to exercise private practice among the families of the insured might be instituted.

These threats produced, as it was intended they should, a stampede among the profession, and whole districts consented to serve, but in a

very large number of cases under protest. As an example we quote the Cambridgeshire protest: "That to save from absolute ruin many of our fellow practitioners, and to retain for them their just and legitimate rights, we can no longer justly condemn those who are forced in self-preservation to go on the panel, but we accept this attitude with feelings of bitter animosity against the government's methods in violating the liberty of action of our profession, which, we can honestly affirm, has always been on the side of just and generous dealing."

Practically identical or similar resolutions were passed by Portsmouth, Surrey, Preston, Hammersmith, Newcastle, Godalming, Brighton, Burnley, Kingston, Lewisham, Cardiff, North Yorkshire, and many other places.

On January 8th the official statement of the panels for the County of London was issued. The 29 districts, containing 1,498,000 insured had 759 doctors to attend them, but these were so unevenly distributed that while there are only about 950 insured to each doctor in Woolwich, Finsbury and Islington, each doctor has 3,600, in Hackney 5,000, in Shoreditch 5,300, and in Marylebone 5,600 to each doctor. As each insured person by the lowest computation, generally admitted, averages ten calls on the doctor's services in a year, that will mean in some districts from 36,000 to 56,000 consultations a year, or from 98 to 152 visits and consultations daily including Sundays!

In London, however, a back current has now set in, and the provisional London Medical Committee that was organized originally to be the Medical Committee under the Act, but which has now been supplanted by the new committee elected at the meetings on December 31st and January 1st, of doctors willing to work the Act, has organized a determined opposition. Largely due to its stand, a large number of medical men who under duress had agreed to work the Act have now asserted their claim to withdraw from the panels. In Willesden, for instance, out of 66 doctors who had allowed themselves to be dragooned on to the panel, 56 have withdrawn (though the London Insurance Committee has so far refused to sanction their withdrawal). In the provinces also the doctors have announced that they are waiting for a lead from London, so the troubles of the Government with the doctors are not yet over; indeed, there are many who think they are only really beginning, in spite of the statement by the Insurance Commissioners, issued on January 10th, that panels had been formed for every county and county borough in Great Britain and comprised the names of more than 15,000 doctors.

On January 8th an important meeting of medical men at which about 1,500 medical men were present, under the presidency of Sir Thomas Crosby, M. D., Ex-Lord Mayor of London, was held at the Queen's Hall when the following resolution was unanimously carried: "This meeting protests emphatically against the unfair methods employed by the Chancellor of the Exchequer for the purpose of coercing medical practitioners to serve on the panels under the Insurance Act, and is convinced that these methods cannot result in a service satisfactory to the insured person." The Act was described by the proposer of the resolution, Mr. V. S. Turner, F. R. C. S., as "distasteful and obnoxious to the enormous majority of the profession and ruinous to many. The Government had relied upon a policy of intimidation, misrepresentation, and falsehood." The Chancellor's methods were described as "those

of the bludgeon and the press-gang." Smaller district meetings of protest are being held in various parts of London.

On January 13th the London panels were published and the official statement said they contained 1,949 names; but a close examination shows only 1,897 separate entries of which all but 738 are duplicates, some names appearing in as many as ten different districts, not only in London but in the adjoining county. Looking through the list I fail to find the name of a single general practitioner that happens to be familiar to me, outside the one or two familiar to everyone through their advocacy of the Act in the newspapers.

It still seems likely, therefore, that my former prophecy will be fulfilled, and that the working of the Act will prove hopelessly inadequate, and will lead to such a torrent of complaint from the insured, who have been mainly ignored and used simply as pawns in the Chancellor's game, that an amending act of a very drastic character will after all have to be speedily introduced. In many districts a very large number of the insured will find themselves deprived of the services of their family attendant who has not gone on the panel. A very large proportion of the agreements are for three months only, and the difficulties will prove so enormous that they will not be renewed by those large numbers who have gone on the panels with avowed bitterness and resentment at their treatment. The inequality of the conditions of service will lead to further trouble, for whereas Oxford, Salford, and a few other places have made arrangements with their Committees with the sanction of the Commissioners, which concede the major part of what the profession is demanding, other Committees flatly refuse to meet the wishes of the profession. In one instance at least, ill feeling has been aroused between an Insurance Committee and the Commissioners who have opened a panel over the heads of the Committee after it had been closed by the latter. And, finally, the powers given to the Commissioners are so arbitrary and despotic, and are by the Act excluded from any appeal to the Courts, that there is nothing to prevent them breaking every agreement made by them and altering the regulations as much and as often as they please. There is no sense of security, therefore, that such terms will be adhered to, even if satisfactory terms are obtained at the beginning. The Act may work satisfactorily for the doctors in closely populated industrial districts, which have hitherto been served entirely by Club practice. There the doctors will receive approximately double their former pay. But the conditions of work will be such that it will be accomplished in a manner, if anything, worse than under the old regime; and the disappointment of the insured consequent on their unfulfilled expectations will sooner or later find vent.

January 14th.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The January meeting of the St. Louis Medical Science Club was held at the Barnard (Free) Skin and Cancer Hospital, Tuesday evening, January 16th, at 8:15 p. m. Dr. Leo Loeb presided. The following program was given:—

1. Demonstration.Carroll Smith
2. The Comparative Reactions of Auricular Musculature.
.V. H. K. Moorhouse
3. Analysis of the Circulating Blood from the Standpoint of
Acidosis.W. McKim Marriott
4. On the Occurrence of Nuclear Particles in the Erythrocytes
Following Splenectomy.Roger S. Morris
5. Autoplastic and Homeoplastic Transplantation of Unpigmented
Skin in Guinea-Pigs.M. G. Seelig

(Signed) W. E. GARREY, *Secretary*.

THE COMPARATIVE REACTIONS OF AURICULAR MUSCULATURE.

By V. H. K. MOORHOUSE, B. A., M. B., of St. Louis.

The point of impulse production in the mammalian heart has been investigated in various ways. This work was done with the object of ascertaining whether there was any marked difference in the reactivity of highly rhythmical areas to temperature changes and to the action of drugs. Heretofore, studies of such changes have been carried out on the intact or isolated heart. The method adopted in this work was that of using isolated strips from the rhythmical areas of the cat's auricle, beating in a bath of Ringer solution, oxygenated and kept at constant temperature. The reactions so studied are independent of confusing changes on the part of other rhythmical areas. A strip containing the sino-auricular node was compared with strips from the septum and coronary sinus regions. Strips from the wall of the right auricle showed an inferior grade of rhythmicity and reactivity. Temperature changes produced nearly parallel responses from the nodal, septal and coronary strips. There were certain differences in the rapidity of response to rises of temperature, but the degree of acceleration for such rises was equally marked in all the strips from the sinus region. Drugs, such as caffeine or those of the digitalis group, produced much the same effect on the nodal and sinus musculature. Drugs affecting the cells or endings of the vagus exerted a more marked inhibitory effect on the strips not containing nodal musculature. The drugs of this type studied were pilocarpine, physostig-

mine, atropine, nicotine. Epinephrine solutions produced an acceleration equally marked in degree and duration in the nodal and coronary strips. The septal strip showed an acceleration of equal degree, but usually of shorter duration. The results, therefore, show that the musculature of the various parts of the sinus region is as highly rhythmical and as reactive as the specific musculature of the sino-auricular node. The only differences in activity observed are such as proceed from differences in innervation by the vagus.

ANALYSIS OF THE CIRCULATING BLOOD FROM THE STANDPOINT OF ACIDOSIS.

By W. McKIM MARRIOTT, M. D., of St. Louis.

A method for the accurate determination of acetone, diacetic acid and β -oxy butyric acid in small quantities of blood (2 to 5 c.cm.) taken directly from the veins of the living subject is described.

Acetone, preformed and from diacetic acid, is distilled off and determined by the turbidity it occasions in an alkaline mercury, silver cyanide solution, the degree of turbidity being estimated in the nephelometer.

β -oxy butyric acid is oxidized to acetone by the Shaffer method and the acetone determined as above.

The following results, expressed as milligrams of acetone per 100 c.cm. of blood, are representative of those obtained:—

	Acetone + Diacetic.	β -oxy butyric.
Normal Dog	0.04	3.2
Normal Dog	0.08	1.7
Normal Dog	0.06	1.7
Normal Child	0.06	4.4
Normal Child	0.08	4.4
Dog—Phlorrhizinized. . .	7.2	10.4
Child in coma.....	23.4	24.8
Child post-operative	11.2	28.0

The method is further being applied to the study of intermediary fat metabolism.

ON THE OCCURRENCE OF NUCLEAR PARTICLES IN THE ERYTHROCYTES FOLLOWING SPLENECTOMY.

By ROGER S. MORRIS, M. D., of St. Louis.

Recently, O. Roth has reported remarkable findings in the blood of a patient whose spleen had been removed three years previously. The diagnosis at operation was splenic anemia, though the history of congenital jaundice given by the patient and the existence of a similar condition in relatives, together with a diminished resistance of the red corpuscles to hypotonic salt solutions, make it probable that he was suffering with congenital hemolytic jaundice. The red count varied between 5,600,000 and 6,468,000, the hemoglobin between 100 and 114 per cent.

Stained specimens of the blood revealed many erythrocytes containing nuclear particles,—on one occasion as many as 20,000 per c.mm., and there were also numerous chromatin dots (*Chromatinstäubchen*); the latter were unusual in that they were stained blue with Romanowski stains. A few normoblasts were observed.

The author described similar changes in the blood of a patient suffering with splenic anemia. Thirteen days following splenectomy many red blood cells containing nuclear particles were found. On the sixteenth day after operation, the nuclear particles had diminished in number, but reddish purple chromatin dots were abundant. A few normoblasts were seen. In a second patient, five days following splenectomy (death on the fifth day), a few nuclear particles and chromatin dots were observed. In the rabbit nuclear particles may become fairly abundant after removal of the spleen, even though the red count remains normal. The constancy with which this reaction occurs in the rabbit has not yet been determined.

AUTOPLASTIC AND HOMEOPLASTIC TRANSPLANTATION OF UNPIGMENTED SKIN IN GUINEA-PIGS.

By M. G. SEELIG, M. D., of St. Louis.

This study has for its aim the determination of quantitative and qualitative differences in homeoplastic and autoplasmic transplantations of white guinea-pig skin on a base previously covered by black skin. The denudations and grafts were always made on the ears of guinea-pigs possessing one black and one white ear.

As a result of the study of twenty guinea-pigs, the following conclusions were reached:—

1. Autoplasmic transplants of white skin on black ears take in the large majority of instances.
2. Homeoplastic grafts fail to take in the majority of instances.
3. The grafts may be lost accidentally, or by shrivelling, crusting, or possibly by desquamation. The homeoplastic grafts are more subject to shrivelling and crusting than are the autoplasmic grafts.
4. Invasion of the grafts occurs in both instances, but probably more rapidly in the case of the autoplasmic graft.
5. Light and the thickness of the grafts do not influence either the taking of the graft, or its subsequent invasion by black pigment.

BOOK REVIEWS.

THREE LECTURES ON UNICELLULA CANCRI, THE PARASITE OF CANCER. By the Late Sir Henry Butlin, Bart., D. C. L., F. R. C. S. Eng., Late President and Hunterian Professor of the Royal College of Surgeons, and Consulting Surgeon to St. Bartholomew's Hospital. Edited by R. H. Paramore, M. D., Lond., F. R. C. S. Eng., Hunterian Professor of the Royal College of Surgeons, Pathologist and Registrar of the Hospital for Women, Soho Square, W. London: H. K. Lewis. 1912.

The great efforts which are being made in the study of cancer in the experimental laboratory seemed to the late Sir Henry Butlin, as they do to many other clinical observers, to lose sight of the clinical pathology of new growths, since it is a fact that the behavior of malignant tumors when transplanted from one animal to another differs from the behavior of the same kind of tumor in the human species. It is only by careful clinical observation that the natural history of malignant new growths, as well as the proper means for destroying them after they have begun to appear, will be reached. But it must not be inferred that the experimental investigation of cancer has not furnished many valuable suggestions for the treatment of the disease; though by itself, it must be admitted, it has not yielded even a working theory for the clinician.

In the little volume before us the question of the nature of 'the cancer cell' is lucidly presented. The author insists that the carcinoma cell is an independent organism similar to some of the protozoa; that it has a life wholly independent and proper to itself; that it lives as a parasite in the body of the animal which is affected with carcinoma, deriving its nourishment from its host, and doing nothing to repay the host for the sustenance of which it robs him. To support this contention the author marshals in strong array the biological and clinical data. He insists, in a forcible argument, that the two great phenomena of malignant disease—the tumor and the metastases—are to be explained on the theory that the new growth, as well as its dissemination throughout the body, is not due to a specific parasite, but to the fact that the cancer cells themselves act as parasites. It is a simple theory, easily understood, and above all, in its ultimate analysis, furnishes the basis for clinical effort on behalf of those afflicted.

Of course, many interesting subjects are touched upon; for example, the questions: Where does the cancer cell come from? To what class of creatures does it belong? Great emphasis is attached to the peculiar characteristic of the cancer cell which, unlike the normal cell that cannot be implanted and made to live, can be implanted and cannot be killed. This cancer cell is named by the author "Unicellula Cancræ," because, in his opinion, even though every new observation of the last years and every new discovery have brought it nearer to the protozoa, yet biologists refuse it a place among these; hence the creation of the parasite which furnishes, according to him, the only rational explanation of the clinical phenomena of cancer.

These Hunterian Lectures, presenting the parasitic theory of cancer, go to the root of the matter in a direct and lucid manner, and are a valuable contribution to the subject and a strong argument for continuing unabated the clinical observations of the disease, since its clinical pathology is far from being a closed chapter.

Attention should be called to the publisher's note that this book was printed to Lady Butlin's order for private circulation only, as a memorial to one who was long and favorably known through his surgical writings, more especially on malignant disease. And what should not be overlooked is that his work on the operative treatment of malignant disease will for some time to come be the standard reference book in English.

TEXT-BOOK OF GENERAL AND SPECIAL PATHOLOGY FOR STUDENTS AND PRACTITIONERS. By Henry T. Brooks, M. D., Formerly Professor of Pathology at the New York Post-Graduate Medical School and Hospital, Consulting Pathologist to Beth-Israel, New York City, etc., etc. Illustrated with 525 Half-tone and Other Text Engravings (110 in Colors), also 15 full-page plates in colors, Containing 40 figures. Philadelphia: F. A. Davis Company. 1912. Price, \$6.00.

The book is practically a translation of Langerhans' "Grundriss der Pathologischen Anatomie" with emmendations and additions. It is needless to say that such a work is of great value, and the profession is to be congratulated in having the classic handbook of the lamented Langerhans in this new American dress.

While the German original is largely a treatise on pathological anatomy, the additions to this American textbook have been added in an apparent attempt to transform it into a complete work on general and special pathology. But many of the characteristic features of the German work remain, among which may be mentioned the general plan, which is excellent, and many of the illustrations. (One hundred and sixty-four of these are taken from the original work.) Large portions of the text, too, as it now stands, are really but translations of Langerhans. Entirely new features are the lucid and complete chapter on immunity by Dr. Allen J. Smith, and the very complete pathology of the eye by Dr. E. L. Oatman. This latter occupies one hundred and thirty-four pages and is entirely too detailed for a work of the present character, being out of keeping with the rest of the book, which is a discussion of principles occupying only about a thousand pages in its entirety.

The present reviewer believes that the somewhat pedantic Latin terminology of the German original, might, in view of the changed scope of this edition, have been profitably dropped or translated. Multitudes of phrases, for instance, like "laesiones," "corpus alienum," "irritamentum," "locus minoris resistentiae," "stadia invasionis, latentiae, incrementi et decrementi," "excitus letalis," "sanatio incompleta," etc., throughout a book "intended chiefly to serve the undergraduate student as an introduction" to pathology are somewhat incongruous when the avowed purpose of the volume is "to give only the essentials" of the subject, and when the other features of a complete work, *e. g.*, references to authors and literature are consistently omitted.

A few minor errors in the editing are obvious, *e. g.*, Fig. 5 of Plate VI is wrongly described in the explanation. Again such terms as "aniline," "ricin," "tropine," "opsonin," etc., should be spelled consistently.

However, these are all inconsiderable blemishes upon what is, upon the whole, a valuable piece of work, and it is a pleasure to reject what was said in the beginning of this review, and admit that the result of the task of the editor and translator is of great value to the American student.

Any detailed criticism of the original work of Langerhans is a work of supererogation, as that work has been repeatedly reviewed by competent judges. However, it is not amiss to point out here that the sections on parasites are in need of further revision, especially as to the nomenclature adopted, and that the illustrations are of uneven merit. Some of the colored plates introduced are of but little value. Plate IV may be instanced. In this plate Figs. 1-3 are very poor representations of malaria parasites, and Fig. 4, intended to represent *Trypanosoma gambiense*, bears but the faintest resemblance to the species named in the accompanying legend.

It is to be hoped and expected that the aforementioned, and similar defects, may be removed from future editions, and that the work may have a deserved sale and enjoy a long popularity in its field.

L'EAU DE MER MILIEU ORGANIQUE. Constance du Milieu Marin Originel, Comme Milieu Vital des Cellules, à Travers la Serie Animale. Par René Quinton, Assistant du Laboratoire de Physiologie pathologique des Hautes-Etudes au Collège de France. Deuxième Edition. Paris: Masson et Cie. 1912. Price, 6 fr.

The hypodermic or intravenous administration of sea-water is enjoying widespread popularity in France, and the reports of its successful action in a variety of diseases are so glowing that, in spite of a considerable amount of scepticism, one cannot help being interested. In the volume under discussion, the author treats not so much the therapeutic utilization of sea-water, though a brief chapter is devoted to this aspect of the question, as the theoretic considerations that justify it. He points out in the first place that all animal life orig-

inated in the ocean. Unicellular organisms were first aggregated into metazoa in the same place; and, in the process of their development into higher animals, have maintained the individual cells of their bodies in an oceanic environment, *i. e.*, in an isotonic saline fluid. Secondly, animal life apparently originated in a warm ocean, and, as the sea cooled, warm-blooded animals were developed. In other words, the fluids bathing our cells are not only saline but warm. Finally, the saline concentration of the primeval ocean was probably much less than it is to-day; in fact, more nearly resembling a physiological salt solution. To be more explicit, our cells are at their best when bathed in a fluid resembling as closely as possible the water of the ocean in which animal life originated. The leap from this conclusion to the assumption, that many, if not most, of the diseases that afflict humanity are due to the departure of our body fluids from the constitution of the original seas, is considerable; but not less than the second assumption that such a dyscrasia may be cured by the administration of sea-water. For the argument in detail, and for the evidence in favor of the efficacy of the treatment, the reader must be referred to the book itself. Suffice it to say, that it is an interesting presentation of the subject, and will afford at least as much entertainment as instruction to the reader.

DISEASES OF THE EYE. By M. Stephen Mayou, F. R. C. S., Late Hunterian Professor, Assistant Surgeon and Pathologist Central London Ophthalmic Hospital, etc. With 119 Original Illustrations and Eight Color Plates. New York: Oxford University Press. 1912.

This short practical manual of "Diseases of the Eye" is one of the Oxford Medical Manuals intended, as this preface frankly states, for "beginners in ophthalmology and practitioners." In extenuation of the decidedly dogmatic tone of the book, the author pleads (and we believe with justice) "that it is better for a beginner to have a knowledge of one method or theory than a confused smattering of several." Befitting a publication primarily intended for the perusal of beginners and practitioners, external diseases receive fuller treatment than fundus lesions.

On p. 37 the term 'mydriatic' is used where evidently cycloplegic is meant. On pp. 43-44, discussing the treatment of presbyopia, one is directed to add to the distance correction + 1 for every five years after the age of forty-five up to the age of sixty (+ 4). As a matter of fact an addition stronger than + 2 at the age of fifty-five and + 3 at the age of sixty is not only not required, but is positively uncomfortable to the great majority of patients. P. 46, third line from the bottom, the word 'vision' should be substituted for 'patients.' P. 56, discussing anisometropia, we are informed that, when one eye is hypermetropic and the other myopic, correction of both eyes will often cause discomfort. So we are advised, in the case of emmetropia or moderate hyperopia in one eye and myopia in the other, not to give glasses, as the emmetropic eye will serve the patient for distance and the myopic eye for reading. Such teaching is wholly at variance with the views of most American oculists who find that these anisometropic patients accept with high satisfaction a full correction in either eye. That portion of the book dealing with inflammatory diseases is well written and compact with information of to-day.

TREATMENT AFTER OPERATION. By William Turner, M. S., F. R. C. S., Senior Surgeon to the 'Dreadnought' Seamen's Hospital, Greenwich, etc. etc., and E. Rock Carling, B. S., F. R. C. S., Surgeon to the 'Dreadnought' Seamen's Hospital, Greenwich, etc. etc. With a Chapter on the Eye by L. V. Cargill, F. R. C. S., Senior Ophthalmic Surgeon and Lecturer in Ophthalmology, King's College Hospital, etc. etc. New York: Oxford University Press. 1912. Price, \$3.75.

This volume of thirty-five chapters considers after-treatment from the point of view of anatomical classification, and is done in rather perfunctory manner. One has legitimate reasons to expect that a volume devoted to special treatment will furnish more information along that line than does the average textbook of surgery; yet, when one turns to two such important subjects as craniotomy and thyroidectomy, one finds that in the one instance (craniotomy) after-treatment "follows the ordinary routine surgical operations elsewhere" (p. 70), and, in the other instance, that not a word is written concerning the treatment of post-operative hyperthyroidism.

The chief value of the book lies in the fact that it emphasizes the necessity of specialized treatment for every operation—a matter of no small importance in this era of general surgery.

MINOR SURGERY. By Leonard A. Bidwell, F. R. C. S., Senior Surgeon to the West London Hospital, Dean of the Post-Graduate College, etc. etc. Second Edition, Revised and Enlarged. With One Hundred and Twenty-nine Illustrations. New York: Oxford University Press. 1913. Price, \$3.75.

The author of this volume covers the field of minor surgery in brief and concrete fashion, furnishing a useful volume for students and a handy reference book for the general practitioner. The opening chapter on technique serves as an excellent introduction to the rest of the work.

Specially to be commended is the judicious use of heavy-faced type in the body of the text, wherever particular emphasis is desired.

LA TUBERCULOSE PULMONAIRE. Maladie Evitable—Maladie Curable. Par le Docteur R. Brunon, Professeur de Clinique Médicale, Directeur de l'Ecole de Médecine de Rouen. Paris: G. Steinheil, Editeur. 1913. Price, 10 fr.

A gossipy book and yet full of meat. The subject of tuberculosis in its entirety as well as in its subdivisions is approached from the point of view of the medical historian, a method calculated to make the duller subject interesting. Otherwise the discussion is popular and perhaps a little superficial. It is the ideal book on tuberculosis to put into the hands of an intelligent and educated layman.

SKIN GRAFTING. For Students and General Practitioners. By Leonard Freeman, B. S., M. A., M. D., Professor of Surgery in the Medical Department of the University of Colorado, Surgeon to St. Joseph's Hospital, etc. With 24 Illustrations. St. Louis: C. V. Mosby Company. 1912. Price, \$1.50.

This small volume is surprisingly complete, the subject of skin-grafting being dealt with from the standpoints of historian, histologist, pathologist and technician. Dr. Freeman is to be congratulated upon the thorough, lucid and withal practical manner in which he has handled the subject. The personal element is strong, as it should be, even in a monograph; but despite this, the excellently selected quotations from surgical literature make the volume a valuable special reference work.

PRACTICAL EXERCISES IN PHYSIOLOGICAL OPTICS. By George J. Burch, M. A., D. Sc. Oxon., F. R. S. New York: Oxford University Press. 1912.

This book was written for the practical classes in physiological optics required by the regulations for the diploma in ophthalmology of the University of Oxford. For the most part the descriptions are general, and it is the author's hope that the book may be found useful in other laboratories.

The book is divided into six sections, the titles of which—Dioptrics, Dioptrics of the Eye, Judgments of the Eye, Sensations, Measurement of Color Sensations, Experiments by Flashing Light—will indicate the field covered.

TUBERCULINOTHERAPIE ET SÉROTHÉRAPIE ANTITUBERCULEUSE. Par Albert Sézary, Médecin assistant du Dispensaire antituberculeux de l'hôpital Laënnec, etc. Paris: J. B. Baillière et Fils. 1912. Price, 1 fr. 50.

In a clear but condensed fashion, the author presents the tuberculin and serum therapy of tuberculosis. One chapter is devoted to the mode of action of the tuberculins in man and animals, another to tuberculin therapy in pulmonary phthisis, a third to this treatment in tuberculosis of other organs, a final one to C. Spengler's immunizing bodies. On the whole, his verdict on tuberculin treatment is favorable, although he is by no means an uncritical advocate. The presentation of the subject is interesting, clear, and to the point.

CASE HISTORIES IN MEDICINE. Illustrating the Diagnosis, Prognosis and Treatment of Disease. By Richard C. Cabot, M. D., Assistant Professor of Clinical Medicine, Harvard Medical School. Second Edition, Revised and Enlarged. Boston: W. M. Leonard. 1911. Price, \$3.00.

The second edition has been revised with the idea of making it more valuable to practitioners. The discussion of the cases is entered into with more detail, the answers to the questions being given. The first edition has been so freely discussed that it seems superfluous to speak here of the nature of the work. It cannot be too highly recommended, especially to those who are interested in the teaching of medicine.

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EDITORIAL.

THE WORKING OF THE BRITISH INSURANCE ACT.

A very serious situation seems developing in regard to the British National Insurance Act. On December 21st, 1912, a final vote of the medical profession, both in and out of the British Medical Association, decided by 11,219 to 2,408 against taking service under the Act. The panels had been opened to doctors from December 14th, but with such an inadequate response that their closure was postponed from December 31st to January 6th, 1913. On January 2nd, Mr. Lloyd George threatened that where the panels were not adequately filled they would be closed to the local profession and service obtained by allowing those who had already joined to engage sufficient assistants; by sending enough men willing to work the Act to establish themselves in practice in the district; or by starting a whole-time service, according to the circumstances of each particular locality. Yet all these courses violated principles formerly enunciated by Mr. Lloyd George, and embodied in the Act, as essential to a satisfactory medical service, viz., service to be rendered personally, not by assistants, panels to be open at all times to any registered medical practitioner, and free choice of doctor by the insured. These procedures meant ruin to many doctors whose practices lay in districts inhabited almost exclusively by the insured classes. The result was a landslide. In district after district doctors met and voted to accept service, in many cases expressing their bitter resentment in the resolutions; so that by January 15th, a service more or less adequate in numbers to the aggregate of the insured was set up, though the proportional distribution was, and still is, a problem, some districts affording only a few hundred insured, while in others there are from 2,500 to over 5,000 insured for each panel doctor.

Those who have accepted service are of four categories: (1) A very few who honestly consider that the conditions of service are or can easily be made satisfactory; (2) a contingent of Government partisans to whom all considerations are subsidiary to the political support of Mr. Lloyd George; (3) the professional derelicts; and (4) a body of medical men, probably much larger than all the others combined, who under threats of ruin have yielded to what they regard as a degrading professional servitude.

To forecast the future under such circumstances is not easy. It is true that the adherents of Mr. Lloyd George jubilantly proclaim that the Act is working smoothly, but it is difficult to reconcile their contention with the facts. Specific instances in plenty have been adduced indicating that the interests alike of the insured, the doctors, and the hospitals, as well as the future supply of medical practitioners, are imperiled. The insured on all sides are complaining bitterly that they can no longer have their own doctor because he is not on any panel; that even in London, delays of from three to five days not seldom occur between the application for and the receipt of medical attendance (inquests have been held on three patients who died without adequate attendance or with none at all); that patients are bandied about between hospital and panel doctor; that insured patients have had to go into the workhouse infirmary; and that besides great delay in getting their prescriptions filled, they have sometimes to trudge many miles to the nearest panel chemist. Many doctors, on their part, complain that Insurance work alone keeps them fully occupied for an average of fourteen to sixteen hours daily, largely with mere clerical labor; that they have had to engage clerks or to press their families into service; that their private practice has been lost to them in consequence; that servants, even those who have been a long time with them, will not stay because of the intolerable extra work involved (in England the doctor's office is for the most part in his house); that they are sent for or applied to for trivial and even absurd matters, as in one case to cut a patient's corns; and that they get no time to attend properly to patients. This last claim was borne out at the inquests held, in one of which the patient, who was merely given a powder for dyspepsia without any examination, died five days later of gangrenous strangulated femoral hernia. The coroner and jury on the evidence that the doctor had between two and three hundred insured persons waiting at the time, and had been occupied by the compulsory clerical work for six consecutive hours, exonerated him and laid the blame on the Act. As to the financial benefits, doctors must now wait three months for their money, which, in industrial districts where a cash basis for everything

obtains, has already brought some of them into the debtor's court; practices, which a year ago were capital assets worth one or more years' purchase, are now unsaleable. And for all this one doctor, who has worked out his remuneration per unit of work done, finds it brings him in nine cents per visit and office consultation!

The hospitals, too, already feel a falling off in individual subscriptions and donations. Moreover, King Edward's Hospital Fund shows a drop of \$330,000 from the preceding year—the first check in a progressive rise since its establishment—while the returns of the Hospital Saturday and Sunday are far from satisfactory in some places. Add to this a heavy expense for insuring their own employees—\$4,250.00 a year at the London Hospital—and it will be obvious that the future efficiency of the hospitals is seriously endangered. Finally, a fall of several hundreds in the number of entering medical students last session suggests the possibility of a shortage of medical men in the near future. These are no longer merely prophetic warnings; they are now actual facts.

When to these difficulties is added a serious schism in the British Medical Association, brought about on the final refusal of service by the defection of some who had been among the foremost opponents of the Act—a *volte-face* due, there is only too much reason to fear, political expediency—one is justified in advancing the thought that unless all the members of the English medical profession are unanimous as regards the working of the Act, the medical service rendered will be imperfect, and that, if agreement is finally effected, so arduous will be the work, that the medical profession will be unable to withstand the strain put upon it.

POVERTY AND DRUNKENNESS.

The relation of poverty and drunkenness has been known a long time and the reasons for the combination have also been known, for it is a matter of daily experience that liquor is the direct or immediate cause of much, if not all, poverty. This is why so few people are able to understand why the remote cause of drunkenness is generally poverty and that a closed chain is thus made so that each result increases its own cause. As the subject is wholly medical, we hope the profession will take more interest in the present discussions than it has in the past. We are the only ones able to explain the phenomenon on strictly scientific grounds, and therefore society depends on us for the data by which practical remedial measures may be taken. Even if we prove that complete prevention of either is beyond human powers, that does not lessen our

social duty to prevent as much as possible, and cure the rest if we can. We have little patience with ignorant extremists who think that the problem is merely one of keeping liquor out of reach, as though men were children unable to climb to the liquor shelf, and we have still less patience with those who know why there is such an irresistible desire for liquor that it will be obtained at any cost of money or effort, and yet do not try to remove the cause.

If there is any one medical fact completely proved, it is that the desire is the cry of an exhausted body for relief from the intolerable pains of fatigue. The worst cases will sell their souls for liquor to anesthetize their tingling nerves and sink into slumber. It is such a well-recognized nervous disease that even if we do not know the exact material basis, we are not justified in calling it a mere neurosis. They are sick men even in the periods between sprees, for if anything is known it is the neurotic condition of heavy drinkers—often, if not generally inherited, but acquired by the bad living of some ancestor. The periodical dipsomaniac almost invariably is of nervous ancestry, and needs no further comment. Nor should it be necessary to direct attention to the milder cases which have long hours of work and find themselves utterly worn out at the week-end, and spend Saturday night in a saloon and Sunday sleeping it off. Both classes work beyond the limit of daily recuperation or are unable to nourish themselves properly—generally both. It has long been known that the more hours an employment keeps the laborers at work, the greater is the drunkenness. Sometimes the defective nutrition is a matter of digestive inefficiency or merely unhygienic habits, but in the vast majority of cases poverty keeps the food beyond reach. When the already insufficient wage is spent for liquor the lack of food is worse and the sufferer toboggans to the unemployable weakling class or the grave. Why, then, do we not talk more about the need of good feeding?

The public has been dreadfully deceived on the question of overfeeding. A few sedentary people able to buy more food than they need, and that of a character which tempts to overfeed, have broken into the magazines with a lot of false theories as to what a man needs, and have created the impression that overfeeding is wellnigh universal. As a matter of fact, many of the working people in fatiguing employments are woefully underfed the world over. Women and military commanders know that the only way to manage husbands and soldiers is 'to feed the brutes.' Insufficient food means fatigue, irritability, drunkenness, inefficiency, mutiny and disaster.

Unfortunately, there is a food value in alcohol, and this is why the matter is so complicated. A little does in fact supply energy quickly

and lessens the need of other carbohydrates. In no other way can we explain the paradox we have repeatedly mentioned: the per capita consumption of alcohol seems to have been increasing and drunkenness decreasing ever since the last century when nearly everyone drank to excess occasionally. The profession seems to be as hopelessly divided in opinion as to this food value as it ever was, and we see no reason to predict an agreement in the near future. But no matter what grade of opinion one may have, it is no excuse for shutting our eyes to the tremendous consumption. We must explain it, and the easiest explanation is that we instinctively use it and have become as accustomed to it as to white bread. Recent reports show that our digestive organs have changed so greatly from the savage type that we cannot subsist on food now sustaining lower races. Has the involution gone so far that we cannot digest enough starch? We cannot take enough sugar, for such strong solutions are really poisonous in a way, but small amounts of alcohol have never produced lesions we are able to detect.

If all this is so, the poor man is between the devil and the deep sea. He may really need a little alcohol, though we know that if liberally fed he does not actually need a drop. The more he needs it, the more he craves its anesthetic powers. If he is of such a low order that he cannot sustain himself properly, and cannot resist the temptation to get relief, is he a type worth saving?

That question may be quite shocking, but is one which the charity organizations are now receiving constantly as to other worthless specimens they are helping to breed like rabbits. No answer has yet been published, though a lot of thinking is going on.

At least one thing is certain. Society has issued its decree that in certain callings there shall be total abstinence to prevent the disasters due to the loss of the keen edge of mental attention from a drink which does not intoxicate. But these are all well-paid classes which naturally are sober—engineers, pilots, and others who have lives in their hands. Chauffeurs, motormen, and horse drivers are also being included, and so are employees of many other classes. It is really the beginning of an era of sobriety.

The proposal under discussion now is whether the danger of injury from any drunken man is not so great as to warrant his confinement for cure, and his permanent detention if incurable. There do not seem to be two opinions as to the worst cases, and the jurists are now devising the legal machinery to confine drunkards.

Our part in the present movement is to determine whether it is possible to prevent the weakling class from excessive drinking. We ought

to be able to harmonize the discordant present views. If they are to persist in killing themselves, we are helpless, and it would really be to their interests to let them drift to the new asylums as soon as possible and have the agony over. We have to do something, and as poverty and drunkenness are mere symptoms of weakness, why not let the race slough them off at once? It sounds brutal put that way, but in practice it will mean greater personal freedom for all of us, with confinement under humane care for those who are unfit for liberty. This is not the opinion of the majority now, but this JOURNAL has no brief for opinions merely because they are those of the majority. The course of civilization is in the direction of restriction of what we consider personal rights. The process is going on to very trivial matters, and it is not at all surprising to hear people say that we have no right to jeopardize other people by getting drunk. City life is now so complicated that it is not possible to devise means of preventing the irresponsible from doing something which will destroy scores of lives. A drunkard may do but little harm in a farm house, but if he upsets a lamp in a crowded tenement he puts thousands in jeopardy. In other words, the restricted personal freedom of modern life requires more self-control than absolute freedom of 'frontier days' or primitive times; and the men lacking it are unfit.

The tremendous consumption of liquor and the enormous capital invested indicate a power which the minority of abstainers cannot overcome. The great mistake of Americans is their great faith in the efficacy of a law which expresses the will of a very small minority. Our statute books are crowded with unenforceable laws to reform us and we might as well revoke them for they cannot do the impossible. It is quite evident that liquor is to be within reach of all adults for a long time, if not forever, and the trend of opinion seems to be in the direction of toleration of its presence for its use, but removal of those who abuse it. Now let us get at the scientific task of finding out why any man abuses it, and removing the causes. As to the man who simply takes too much without intoxication—well, that's a long study and another story.

BACKWARD SCHOOL CHILDREN.

The management of children of slow or defective development is receiving a great deal of attention, but unfortunately physicians are not taking as much part as they should, so that the pedagogues are unadvisedly adopting the dangerous view that the slow should somehow be

forced to keep up with the fast. Every normal child is a law to itself,—no two having exactly the same rate of development, and its education is an individual matter. What is best for one is not necessarily even good for the next. The curse of institutionalism is the tendency to put each one in the same sized straight-jacket which squeezes the big to death, and lets the smaller ones rattle around.

Extensive statistics have been carefully collected showing the percentage of children who are over age in the various grades, and all kinds of schemes have been suggested whereby the children in each grade shall be of the same approximate age. As far as we can now determine, the published figures are not far from what normal variation should be, for some children of twelve ought to be with those of ten or eleven, and some might safely be with those of thirteen or even fourteen.

The curious part of the matter is the desire of American teachers to force the backward, whereas English observers have called attention to the fact that the American youths in technical schools are generally two years ahead of English students, but that in all their schools even these slower developing foreign boys are being unduly forced. It is charged as well that they are being crammed full of useless knowledge which stifles their own originality. The tendency abroad seems now in the direction of finding out the child's capabilities and training them irrespective of all other pupils. The ideal, of course, is a separate class for each child, though as a matter of fact, enough are sufficiently alike to be classed together. The new point is that the criterion is individuality and not age, and that neither the fast nor the slow must be forced or crammed.

Some of the backward children are really cases of imbecility, which should be removed to schools making a specialty of training them, and their detection really requires an expert alienist. Where the medical profession is doing good work, and could do better, is the discovery of physical defects which are interfering with the child's perceptions, making it appear stupid. The grandest kind of success is attending the medical examination of school children, for the physicians are finding serious conditions which were not even suspected by the parents. Quite a large number do not see well enough, some have such high-grade defects as to be unable to see the blackboard itself, while others overcome their disability at the expense of an almost prostrating eyestrain. It is now accepted as a matter of fact that every child's eyes must be examined by a specialist and defects corrected. Similarly the ears, nose and throat are all too frequently the seat of remedial conditions which are interfering with perceptions. It has also been found that the teeth exert a profound influence, and there is a widespread movement to correct the de-

fects by free clinics, though we cannot see why the dentists should give their service gratuitously. It is a labor for the public good and the public should give a living wage at least.

The last matter to receive attention is the appalling amount of under-feeding and malnutrition. The facts were at first denied, but their discoverers went calmly along in the plan of supplying nutritious food in the midday recess. It is not a charity at all, although the small prices, one to five cents, do not entirely cover the expenses. So far the experimental lunch rooms have been successful beyond the wildest expectation. Children, who were backward simply because of starvation, have started at once to grow and develop. The plan has worked so well both here and in Europe, that we may confidently predict the time when lunch rooms will be part of every school equipment.

Now comes the outdoor school for the frail. Here, too, Europe has taken the lead by the establishment of such schools for tuberculous children, who are thus given the advantages of education while undergoing treatment. It was but a step to include the feebler children to prevent the tuberculosis which seemed inevitable, and the amazing discovery was made that not only did they become robust, but that in mental development they actually surpassed the 'normal' children condemned to the stuffy school-rooms. The results are so grand that we wonder why in the name of Heaven all schools are not in the open air. Even when stormy weather drives them indoors, the windows could be left open. One thing is certain, the medical profession has utterly failed to force school authorities to ventilate the rooms properly, although we have been hammering at the matter for a century. The nasty sour-smelling rooms still exist, and we are constantly compelled to keep children out of school and in the open air. Now let us rise in our wrath and compel all school children to stay in the open air in school hours, and as much as possible at other times, even sleep in the open. There is an enormous advantage in the very coldness of the air, and even the smallest tots instinctively tumble about in the snow in bitterly cold weather while the hot season kills them.

So it does seem that the problem of backwardness is being solved as it should be—by removal of the causes and not by any deadly system of forcing. It is a medical matter, not a pedagogical one. Every physician, whether in practice or not, should constitute himself a member of this big body of educational reformers. We are preeminently fitted for this public duty and must do it—indeed, we are the only ones who can. It should never be necessary to remove a frail child from school, for that is a confession that the methods are still harmful, whereas they should build up the feeble.

OPINION AND CRITICISM.

PITCH-WORKERS' CANCER.

There is probably no more interesting phase of medical activity than that which deals with the prophylaxis and cure of the various industrial diseases. The recent contribution by H. C. Ross and J. W. Cropper* illustrates anew, and very concretely, the immense economic value of purely scientific medical investigation.

As a result of the growth of the manufacture of patent fuel (briquettes) many of the workers of this industry were attacked by epitheliomas similar to the chimney-sweeps' cancer. Investigation developed the fact that the pitch and tar used in the course of making the briquettes were solely responsible for the growth of these cancers; and the British Home Office thereupon drafted rigorous regulations inimical to the prosperity of an industry that produced some 3,000,000 tons of patent fuel a year. The Home Office was persuaded to hold the restrictions in abeyance until Ross and his co-workers could study pitch-workers' cancer and possibly suggest a practical and economical solution of the problem involved.

Preliminary clinical study showed "that the neck and face of all briquette workers are swarthy. The hair follicles and sebaceous glands become the seat of a minute plug of pitch. The neck, in consequence, has frequently a goose-skin appearance. Irritation, with the formation of shotty papules, follows as the secretion of the glands becomes obstructed. These are most marked on the forehead, on the neck and on the ulnar side of the forearms. The sebaceous glands, especially behind the ears, where washing is less likely to be thorough, become very prominent, and comedones (blackheads) are generally noticeable. Sometimes there are scattered patches of pigmentation over the arms, with hyperemia and distension of the small veins, or the epithelial layers become thickened with formation of definite warts. Favorite seats for warts are the eyelid, ear, and indeed any part of the face. Numerous scars, marking the place where the base of the wart had ulcerated, were found on the face and neck. Only exceptionally, however, do the warts take on a malignant character, and then usually, but by no means invariably, the scrotum is the seat of the lesion."

Animal experimentation showed that there was in the pitch a substance which Ross and his co-workers call an auxetic—an excitor of re-

*The Problem of the Gasworks Pitch Industries and Cancer. The John Howard McFadden Researches. London: John Murray. 1912. Price, 6 s.

production. This auxetic had the power of inducing an almost unlimited cell reproduction when injected under the skin, or when applied to open ulcers. The action of the auxetic of pitch and of numerous other auxetics (in all, there are thirty-one) were studied in detail, and from this study was developed the conclusion that, primarily, for the development of a neoplasm, the action of an auxetic was necessary. An auxetic alone, however, will not produce cancer, for the cell reproduction does not assume an infiltrating character.

In order, therefore, to explain the development of cancer, the authors fall back on a hypothesis—namely, that when cancer develops there is present, in addition to the auxetic, a so-called 'augmentor' which causes the proliferating cells to infiltrate. Chief among the augmentors are choline, cadaverine and atropine in weak solutions. The augmentors will not induce cell division by themselves, but when added to auxetics, they multiply the proliferative power of the latter by five, and have a powerful action in exciting ameboid movements in white blood-cells and in epithelial cells.

Further investigation showed that not all pitch workers suffered from cancer, but only those who worked in fuel factories that handled gasworks pitch. Blast furnace pitch seemed to be innocuous. Laboratory experimentation confirmed this fact by demonstrating an absence both of auxetics and augmentors in blast furnace pitch. The tar, from which pitch is the end-product, is also innocuous when derived from blast furnaces, but highly irritant when secured from gasworks. These irritant substances it was found could be removed by washing the tar in water; and the burden of the report to the Home Office by Ross and Cropper is that patent fuel manufacturers should either use blast furnace pitch exclusively, or else thoroughly wash all gasworks pitch.

ORIGINAL ARTICLES.

ABDERHALDEN'S SERODIAGNOSIS OF PREGNANCY AND ITS PRACTICAL APPLICATION.

By HENRY SCHWARZ, M. D., of St. Louis.

During the year 1912, Professor Emil Abderhalden, Department of Physiology in the University of Halle, Germany, published quite a number of articles describing in detail his methods for a serodiagnosis of pregnancy and the results obtained therewith by himself and his pupils.

Abderhalden has proved that in the blood of pregnant women there is present a proteolytic ferment which causes cleavage of placental albumin and of placental peptone. This ferment is absent in the blood of non-pregnant women.

The presence or absence of this enzyme is demonstrated either by the dialyzation method or by the optic method.

The dialyzation method is carried out as follows: About 1 gram. of placental albumin is placed into a small dialyzer together with 2 or 3 c.cm. of serum; for outer fluid from 15 to 20 c.cm. of distilled water are used. This dialyzation apparatus is placed into an incubator where it remains from sixteen to twenty-four hours, when the outer fluid is tested by color reaction for the presence of peptone. For this color reaction Abderhalden at first used the biuret reaction; but, this reaction having its limitations and requiring a certain experience, he now uses and strongly recommends *triketohydrindenhydrate*.

The optic method requires rather expensive apparatus, but is otherwise quite simple. A mixture consisting of 1 c.cm. of a 10 per cent. solution of placental peptone and of 2 c.cm. of serum is placed in a very small polarization tube and the initial rotation is read off in the polariscope. The tube is now placed into an incubator and the change in rotation is read off from time to time during the next thirty-six hours.

Abderhalden found that the maximum change in rotation with non-pregnant serum never exceeded 0.03° , while with pregnant serum the change in rotation amounted to from 0.05° to 0.2° and more.

Abderhalden has tested a great many sera, both human and animal, and has found that in every case in which the reaction was positive, the individual was pregnant, while in all cases of negative reaction the individual proved non-pregnant.

The reaction is positive from the middle of the second month of pregnancy on—that is to say six weeks from the first day of the last menstruation, and disappears from ten to fifteen days after pregnancy terminates irrespective of the time of such termination, whether it takes place at term or prematurely, and irrespective of the fact of nursing or not nursing the baby.

Abderhalden's results have been confirmed by Veit, of Halle, by Frank and Heimann, of Breslau, by Franz and Jarisch, of Gratz, by Henkel and Lindig, of Jena, and by Petri, of Munich.

According to the publications of these various investigators in over 300 cases examined, there has not been one instance in which the reaction failed to diagnose an existing pregnancy, or in which serum taken from a non-pregnant individual gave a positive reaction.

To these testimonials the writer can now add one from the Department of Obstetrics of the Washington University Medical School. We took up this work early last autumn, and after many trials and tribulations we have managed to exclude many sources of error, and are obtaining results absolutely confirming the claims of Abderhalden.

So far we have limited ourselves to the dialyzation method; but, since the results are convincing and since this method in our hands works out correctly, we are about to test the optic method in the laboratories of the Department of Biological Chemistry, and expect before long to add a polariscope to the equipment of the obstetrical laboratory.

For the benefit of those who desire to make a practical test of the serodiagnosis of pregnancy, the writer will give a minute description of every step in the dialyzation method; but before doing so it seems desirable to consider Abderhalden's work regarding the protective ferments of the animal organism which led him to evolve the biological test for pregnancy. Such consideration will enable us to discuss the practical application and limitation of this test.

The study of the digestion of proteids proved to Abderhalden's satisfaction that it has for its prime object not the conversion of undialyzable proteids into dialyzable peptones, but that digestion is in reality a very complete reduction process, cleaving proteids of widely different origin and of very complex individual structure into comparatively simple cleavage products which no longer possess any individuality; in a word, complete gastro-intestinal digestion reduces the proteids to amino-acids, and it is in this form that proteid food-stuffs are absorbed into the blood. From this indifferent and simple building material each body cell reconstructs more complex structures according to its own individual character.

The importance of this digestive work becomes clear when we try to introduce food-stuffs into the circulation without having them properly reduced by digestion, that is to say, parenterally, by intravenous or subcutaneous injections.

It is well known that under such conditions phenomena manifest themselves, which are absent when the gastro-intestinal canal with its ferments has reduced these substances to sufficiently simple forms. Such phenomena are the formation of precipitins, anaphylaxis, etc.

Abderhalden next tried to answer the question whether the animal organism is helpless against such parenterally introduced substances, or whether it has the means to deprive them of their individuality by subsequent cleavage and reduction. He found that the latter is indeed the case.

If serum from a normal dog is mixed with a solution of cane-sugar, the sugar remains unaltered, which fact can be proved by chemical methods or by the optic method. If one injects a little cane-sugar into the system of the dog from whom the first serum was taken, it will be found after a while that the serum of this dog is now able to cause cleavage of cane-sugar. Similar results are obtained when proteids are introduced: the serum of a normal dog causes no cleavage of edestin (vegetable albumin), but the serum of the dog will cause cleavage of edestin when a little of that substance has been introduced parenterally into the system of the dog some time before the blood for the test is taken. This fact can be demonstrated either by the dialyzation method, or by the optic method.

After it was thus proved that the animal organism defends itself against species-foreign substances by the mobilization of ferments, the question suggested itself whether or not a similar mobilization of protective ferments takes place, when substances, native to the body, but foreign to the blood, are introduced into the circulation.

Experiments on dogs gave no uniform results, although the formation of such ferments could repeatedly be demonstrated; therefore, it occurred to Abderhalden that the examination of the blood of pregnant individuals ought to be a great help toward solving this problem, because Schmorl and Veit had shown that syncytial cells and greater or lesser parts of chorionic villi become detached from the placenta and enter the maternal circulation.

For this reason the systematic examination of the blood of pregnant individuals was taken up by Abderhalden and led to the uniform results already mentioned; in pregnant individuals the presence of a proteolytic ferment which caused cleavage of placental albumin and placental peptone could be demonstrated in every case; while, in serum taken from non-pregnant individuals, no such ferment was present.

The blood of many women and of various animals—cows, horses, dogs, rabbits and guinea-pigs—was examined; and the reaction was always positive when pregnancy existed, and negative when the respective individual was not pregnant.

Abderhalden is careful to mention that, while the supposed presence of syncytial elements in the blood of pregnant women is the hypothesis

which caused him to undertake these experiments, it is quite possible that the mobilization of these proteolytic ferments is due to a more general exchange of substances between the placenta and the maternal blood.

In the writer's mind there is no doubt that the reaction is due to the entrance, into the maternal blood, of substances derived from the syncytium; not so much from the entrance of whole cells of villi, which is exceptional and not the rule, but simply from the wear and tear of the syncytial cells. It must be remembered that the chorionic villi digest their way into the maternal blood-vessels just as soon as the ovum is permanently implanted and that this implantation is complete a very few days after the menstrual period has been missed, so that from this earliest period of pregnancy to the time of delivery all the placental villi are dipping directly into the maternal blood.

A positive reaction with the biological test for pregnancy, therefore, means that the individual from whom the serum was obtained either harbors placental elements in the body, or else has harbored such elements up to a short period ago, which period does not exceed two weeks; it means that the individual is or has been pregnant, unless placental substances have been injected into the system intravenously or subcutaneously, in which case even a male individual's serum would give a positive reaction for pregnancy.

It does not mean the presence of a fetus, much less that of a living fetus, for hydatiform moles, in the absence of a fetus, will give a positive reaction; the same is undoubtedly true of chorio-epithelioma in the absence of any recent pregnancy.

Veit points out the importance of the reaction for the differential diagnosis of ectopic gestation, but the writer thinks he overestimates its value for that particular complication. A positive reaction simply tells us that the patient is pregnant; but, since the uterus in these cases is considerably enlarged during the early weeks, a positive reaction can give us no information as to whether or not the ovum is inside of the uterus.

The serodiagnosis of pregnancy has, however, a great practical value, for it enables us to make a positive diagnosis under conditions and at a period which heretofore rendered a diagnosis impossible.

It often becomes desirable to ascertain whether or not a nursing mother, who has not menstruated since her baby was born and whose uterus is only moderately enlarged, is pregnant. At other times we are consulted on account of girls or women who have no right to be pregnant and in whom the amenorrhea may be due to change of climate or other causes. In the latter a pelvic examination is often undesirable and even indelicate, while an examination of the blood cannot offend the sensibility of anyone. Again, medico-legally, it is at times important to make a positive diagnosis as to the presence or absence of pregnancy, or as to the condition of

recent birth; and, in the past, the abdomen has now and then been opened, because a pregnant uterus had been mistaken for a new formation. In all these conditions the sero-diagnosis of pregnancy will give us definite reliable answers.

It is in order now to describe in detail the various steps in the biological test for pregnancy by the dialyzation method.

The Dialyzers.—Abderhalden uses the small dialyzing thimbles made by Schleicher and Schuell (Diffusionshuelle No. 579). These come in boxes of twenty-five thimbles and are obtainable in the United States from the Arthur Thomas Company, of Philadelphia.

These dialyzers are of very varying quality; a good many of them are so tight that they will not dialyze peptones; others are so loose that they will permit albumin to pass. It will be found that about one thimble in five is impermeable to albumin and permeable to peptone. These are the only ones to be reserved for actual work; the rest have to be eliminated. We, likewise, have found it necessary to work as far as possible with sterile utensils and to use antiseptics liberally in order to get reliable reactions.

The thimbles when taken out of their box are dry and hard; they are soaked in cold water for at least six hours; their upper border is threaded with a silk loop for more convenient handling; they are now thrown into boiling water and boiled for five minutes. For dialyzing vessels we use the round urinary glasses with a flat bottom which are used for the collection of specimen in the hospital wards. These tubes are plugged with absorbent cotton and sterilized. Into this outer container are placed 20 c. cm. of distilled water to which a few drops of chloroform are added; the fluid is covered with a thin layer of toluol; the dialyzing thimble is charged with 5 c.cm. of serum (either human serum, or hog-serum obtained from a slaughter-house and kept on ice) to which 5 drops of toluol are added. The thimble is now placed into the dialyzing vessel and suspended from the top by the silk string in such a way that the outer fluid stands about 1 cm. higher than the serum in the thimble, the string being held in position by the cotton plug which is replaced. The outer vessel must be so narrow that the distance between its inner wall and the wall of the thimble does not vary much from 0.25 cm. This dialyzing apparatus is now placed into the incubator and kept there for twenty-four hours at a temperature of 37°C.

The outer fluid is now tested for albumin. Until lately we used the biuret reaction for this purpose, but we are now using the triketohydrindenhydrate exclusively. This reagent is marketed by the Farbwerke-Hoechst Company, New York, under the trade name of *ninhydrin*. It comes in small glass tubes of 0.1 gm. each; it is composed of colorless prisms which turn red at a temperature of 125°C. and melt at a temperature of 240°C. It is freely soluble in water; the aqueous solution stains the skin violet-red; it gives color reaction with albumin, peptone

and amino-acids. When the test is negative, the tested fluid remains colorless or turns slightly yellow; the positive reaction changes the tested fluid to a beautiful clear blue color resembling solutions of copper sul-

phate. The formula for ninhydrin is:
$$\begin{array}{c} \text{CO} \\ \diagup \quad \diagdown \\ \text{C}_6\text{H}_4 \quad \text{C (OH)}_2 \\ \diagdown \quad \diagup \\ \text{CO} \end{array}$$

The reagent is especially valuable for the detection of cleavage products which do no longer give the biuret reaction, for it gives its characteristic blue color in the presence of any combination which possesses an amino group in α position to the carboxyl group.

The contents of one tube of ninhydrin is dissolved in 10 c.cm. of distilled water, giving a 1 per cent. solution. This solution should not be exposed to the light. We make our solution in a strong test-tube and keep the latter in a dark-colored glass bottle. Abderhalden tests 10 c.cm. of the dialysate with 0.2 c.cm. of the 1 per cent. solution of ninhydrin; however, we find that half the quantity of each works equally well and prevents boiling over with certainty. The test, thus modified, is carried out as follows:—

From the dialysate 5 c.cm. are transferred to a good-sized test-tube by means of a sterile pipette, care being taken not to carry over any toluol or chloroform. To this is added 0.1 c.cm. of the 1 per cent solution of ninhydrin, also two or three small chips of broken china to prevent boiling over. The contents is now brought to the boiling point and kept boiling for exactly one minute by the watch. On cooling the liquid will assume a more or less deep blue color if the test is positive; if negative, it will remain colorless or turn slightly yellow. Half an hour should be allowed to bring out the color reaction.

All dialyzing thimbles, whose dialysate has given a negative test, are next prepared for the test of permeability to peptone; all others are eliminated.

For the peptone test Abderhalden in the beginning recommended Peptone-Witte. This is, however, not a pure peptone, for we found that in a filtered solution a few drops of the Esbach reagent will cause a copious precipitate. Abderhalden now uses a 1:1000 solution of Seiden-Peptide. This peptone is prepared by the Hoffmann-LaRoche Chemical Works, New York. It dissolves readily in water, making a clear transparent solution which gives no precipitate with picric acid or ammonium sulphate. It gives the biuret reaction, and turns blue with ninhydrin.

For the peptone test the dialyzing thimbles, after thorough cleansing, are charged with 5 c.cm. of a 1:1000 solution of Peptide-LaRoche, which is dialyzed against 20 c.cm. of distilled water. Chloroform and toluol are again added as in the serum test. After twenty-four hours in the incubator the dialysate is tested with ninhydrin; all thimbles, whose dialysate gives a negative reaction, are eliminated, and the remaining

few are preserved in chloroform water under a layer of toluol. They may be safely employed in the biological test for pregnancy; and, if proper care is taken, they can be used for a long series of tests. We keep each tested thimble in a numbered container of its own.

Preparing and Preserving the Placental Albumin.—Abderhalden states that the proteolytic ferment of pregnancy is not specific, but insists that the albumin and the peptone for the dialyzation method, or for the optic method, be prepared from placentas of the species to which the individual, whose serum is to be tested, belongs. He found, that while the serum of pregnant women caused cleavage of albumin prepared from cow-placenta, and while the serum of a pregnant mare did the same, the cleavage was not as complete as when placental albumin was acted upon by serum from pregnant individuals belonging to the species from which the placenta was derived.

The placenta contains only a limited amount of the substance on which the pregnancy ferment acts; and for this reason the albumin should be prepared from placentas which are quite fresh, otherwise autolysis may have destroyed a great part of this substance. For the same reason frequent washing and soaking in water of the unboiled placenta should be avoided. We prepare the placental albumin as follows: A fresh placenta is wiped clean of blood; membranes, cord and the top layers of the placenta (chorionic membrane) are cut away. (It is not necessary to remove the decidua serotina.) The remaining portion, consisting principally of placental villi, is cut in small pieces about the size of hazelnuts; in the meantime, half a gallon of water, to which were added two drops of glacial acetic acid, has been brought to the boiling point in an enameled pot. The pieces of placenta are thrown into this and are boiled for five minutes; they are next poured out on a straining-cloth; the pot is cleaned, and water, prepared as before, is again brought to the boiling point, and the pieces of placenta are once more boiled for five minutes. They are again poured out on a straining-cloth, which is spread over an enameled pitcher, so that the water in which they have been boiled can be tested by ninhydrin. If it gives a negative reaction, the albumin is fit for use; otherwise, the boiling has to be repeated until the reaction becomes negative. It is essential that the albumin should be coagulated promptly.

The pieces of placenta so prepared are preserved in small glass jars of a capacity of about 60 c.cm.; and they are kept in chloroform water covered with toluol and placed in an ice-box until wanted. For each experiment a fresh jar of preserved placenta is opened. Prepared in this manner, placental albumin will keep indefinitely.

Care in Securing and Preparing the Serum.—We secure about 10 c.cm. of blood from a vein in the arm under the same aseptic precautions and in the same manner as we do for bacteriological work. The blood is drawn directly into a sterilized centrifuge tube, centrifuged and kept on ice until wanted. Usually the test is made on the same day; sometimes

on the next day. This quantity of blood yields approximately 5 c.cm. of clear pale serum; red or hemolytic serum should never be used.

We take the blood early in the morning before the patient has had breakfast, because if taken during the height of digestion the blood will undoubtedly contain amino-acids, and the dialysate may give a color reaction with ninhydrin. Abderhalden has noticed this several times.

We have tested ninhydrin for the detection of amino-acids, and find that it gives a distinct reaction when amino-acids are present in solution in the proportion of 1:15,000; and even a solution of 1:20,000 shows a bluish tint.

For this test we use solutions of erepton which is prepared by the Farbwerke-Hoechst Company according to Abderhalden's directions. It is derived from lean meat by the consecutive action of pepsin and hydrochloric acid, trypsin, and erepsin; it is freely soluble in water and gives no longer the biuret reaction; it represents meat digested down to the amino-acids.

Description of an Actual Test.—The contents of a small jar of placental albumin is poured into a dish and washed with distilled water until all traces of chloroform and of toluol have disappeared. The pieces of placenta are dried between filter-paper; then placed into a mortar and ground into a pulp; all fibrous particles are picked out. Of the remaining pulp portions of 1 gm. are weighed off; these are dropped into tested dialyzers which are next charged with from 4 to 5 c.cm. of the serum to be tested. The transfer of the serum from the centrifuge tube to the dialyzer is made by means of a sterile pipette, the outside of the dialyzer having been cleansed with distilled water to remove particles of placenta or serum, which may have been spilt during the filling of the thimble. The dialyzer is placed into a sterile container which has been charged with 20 c.cm. of distilled water covered by a thin layer of toluol, 3 drops of toluol being added to the contents of the thimble. The outer fluid must stand about 1 cm. higher than the fluid in the dialyzer. The dialyzing apparatus is placed in the incubator.

For each test with presumably pregnant serum, a control test must be started. This may be done by digesting placental albumin with serum from a male individual, or from a female who is known not to be pregnant; or test and control test are made with portions of the serum to be tested. The portion for the control test is inactivated by heating.

After eighteen or twenty-four hours the dialysates are tested with ninhydrin. There are three possibilities:—

1. The dialysate of the test shows the characteristic blue color, while that of the control remains colorless; the person whose blood has been tested is pregnant.

2. The dialysates of test and of control remain colorless; the person whose blood has been tested is not pregnant.

3. The dialysates of test and control turn blue; there is something

wrong and the experiment must be repeated after the error has been discovered and eliminated; it may be that the control-dialyzers leak, or that the control-serum was obtained during digestion and contains amino-acids, or that the individual, who furnished the control-serum, is pregnant, or that the dialysate of the control has been contaminated by lack of care.

Abderhalden works with smaller quantities of serum; at first he used from 2 to 3 c.cm.; at present he uses only 1.5 c.cm. He gives no explanation for this change. Since we have been using the ninhydrin reaction exclusively, we find that the serum is very apt to contain traces of amino-acids which will give positive reaction when 5 c.cm. are used, while when 1.5 c.cm. are used the dilution becomes so great that no reaction takes place.

BIBLIOGRAPHY.

- Abderhalden: Protective Ferments of the Animal Organism. J. Springer, Berlin. 1912.
- Abderhalden: Diagnosis of Pregnancy, with the Aid of the Optic Method and the Dialyzation Method. (*Muench. med. Wochenschr.*, No. 24, 1912.)
- Abderhalden: Further Contribution to the Diagnosis of Pregnancy, with the Aid of the Optic Method and the Dialyzation Method. (*Muench. med. Wochenschr.*, No. 36, 1912.)
- Abderhalden: Further Contribution to the Biological Determination of Pregnancy. (*Zeitschr. fuer Physiol. Chemie*, Vol. 81, p. 90, 1912.)
- Abderhalden: Further Studies of Anaphylaxis. (*Hoppe-Seyler's Zeitschr. fuer Physiol. Chemie*, Vol. 82, p. 109, 1912.)
- Abderhalden: The Serodagnostic of Pregnancy. (*Deutsch. med. Wochenschr.*, No. 46, p. 2160, 1912.)
- Abderhalden and Kiutsi: Biological Investigation of Pregnancy. (*Zeitschr. fuer Physiol. Chem.*, Vol. 77, p. 4, 1912.)
- Abderhalden, Freund and Pincussohn: Serological Studies with the Optic Method During Pregnancy and Especially in Eclampsia. (*Prak. Ergeb. der Geburtsh. und Gynaek.*, Vol. 2, Division 2, p. 367, 1910.)
- Abderhalden and Weil: Diagnosis of Pregnancy in Animals with the Aid of the Optic Method and the Dialyzation Method. (*Berl. Tieraerztl. Wochenschr.*, No. 36, 1912.)
- Frank and Heimann: The Biological Diagnosis of Pregnancy by Abderhalden and Its Clinical Significance. (*Berl. klin. Wochenschr.*, No. 36, 1912.)
- Franz and Jarisch: Contributions to the Knowledge of the Serological Pregnancy-Diagnostic. (*Wien. klin. Wochenschr.*, No. 44, p. 1441, 1912.)
- Veit: Value and Application of the Serodagnostic of Pregnancy. (*Zeitschr. fuer Geburtsh. und Gynaek.*, Vol. 72, Part 2, p. 463.)
- Brandenburg: Albumin Completely Cleft by Fermentation and its Clinical Application. (*Med. klin.*, No. 1, 1911.)
- Ruhrmann: Triketohydrindenhydrate. (*Journ. Chem. Society*, No. 97, pp. 1436 and 2025, 1910; No. 99, p. 792, 1911.)
- Petri: Biological Diagnosis of Pregnancy. (*Zentralbl. fuer Gynaek.*, No. 7, 1913.)

FROM THE BORDERLAND OF MEDICINE AND DENTISTRY.

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The evolution of the medical specialist within the province of the general practitioner received its present impetus with the dawn of the nineteenth century through the introduction of specific research. However, even in the remotest periods of medical history we meet with examples in which physicians confined their activity to the treatment of special diseases. Apparently there has always existed a desire on the part of the general practitioner to limit the field of his usefulness to the care of disturbances of single organs or to the treatment of specific ailments. Herodotus, for instance, makes a very positive assertion regarding the specialization among the Pastophores, *i. e.*, the Egyptian physicians. He states that: "Medicine is practised among them [the Egyptians] upon a plan of separation; each physician treats a single disease and no more. Thus the country swarms with medical practitioners, some undertake to cure diseases of the eye, others of the head, others again of the teeth, others of the intestines, and some others which are not local." In the early writings of the Zend-Avesta, definite instructions are given to the surgeon, *i. e.*, "that he must first thrice essay his skill upon a slave or on a lower caste of man before operating upon their betters." Among the Greeks medical specialists apparently were of common occurrence. Plato in "The Charmides" records the following pertinent complaint as made by Socrates regarding the increased tendency of specialization: "And this is the reason why the cure of many diseases is unknown to the physicians of Hellas, because they are ignorant of the whole, which ought to be studied also, for a part can never be well unless the whole is well." Similar conditions prevailed among the Romans; their leading physicians were either native Greeks or they had received their medical education on Greek soil. To receive proper recognition by the medical fraternity it was essential for the young practitioner of ancient times to include in his curriculum a pilgrimage to the world-famous shrine of knowledge, the University of Alexandria. From the time of its foundation by Alexander the Great, about 320 B. C., to its destruction by Omar, A. D. 641, this exalted seat of learning exercised a most wholesome influence on the higher types of education in all its branches of the then known civilized world. The paralyzing influence of the medieval age on scientific matters in general impressed its stamp of retardation also indelibly on the development of medicine. The only

bright star in this period of papal despotism is the appearance of Paracelsus, the Luther of Medicine, as he has been appropriately christened. When on St. John's day, in 1527, Paracelsus burned publicly in the market-place of Basel the works of Celsus, Galen, Avicenna and other orthodox medical writers, exclaiming, "I have burned all these books so that all misery may be carried away with their ashes," a new era had dawned in scientific medicine.

Fortunately, medicine has had its renaissance. With the reorganization of the Vienna Medical School by Van Swieten, in 1750, scientific research received a reverberating impulse, and its vibrations are felt to this very day. Laryngology saw its birth in 1855 with the introduction of the laryngoscope, more or less simultaneously, by Garcia, Czermak and Tuerck; although Liston had stated in 1837 that "the existence of the swelling of the laryngeal mucosa can often be ascertained by means of a speculum; by such a glass as is used by the dentists on a long stalk previously dipped in hot water," etc. The dental mirror, by the way, the most utilitarian instrument of our whole armamentarium, was introduced about 1800 by Chevalier Bartholomeo Ruspini, a prominent Italian dentist then practising in London. There seems to be sufficient evidence to assume, however, that the Roman surgeons at the beginning of the Christian era used such an instrument for the inspection of the oral cavity. The divorcing of ophthalmology from surgery was largely brought about by the fundamental operative work of von Græfe (1850) in which he was materially aided by the discovery of the ophthalmoscope by Helmholtz in 1851. About this period the knowledge of diseases of the ear was placed upon a rational basis by Politzer and Gruber, and Hebra founded the science of dermatology.

The most remarkable achievements in the specific domain of major surgery are to be accredited to two epoch-making events, *i. e.*, the discovery of general anesthesia and the introduction of antiseptics. "If America has contributed nothing more to the stock of human happiness than anesthetics, the world would owe her an everlasting debt of gratitude," said the late Samuel D. Gross, the eminent surgeon, who had ample opportunity to observe in his own operating-room the vast changes that followed the introduction of this boon to suffering humanity.

To the dental profession of the United States belongs the honor of having introduced the first practical method of obtaining complete anesthesia. With the introduction of nitrous-oxide gas by Horace Wells, in 1844, the stimulation for further research in this particular field was initiated, and the future development of anesthesia was merely a sequence to the incentive given by this New England dentist. The introduction by Koller of local anesthesia in minor surgery, in 1884, is of equal importance, and some of the recent developments in the treatment of diseases of the eye, ear, nose and oral cavity depend almost exclusively upon the remarkable achievements obtained through the possibilities of in-

hibiting sensation within circumscribed areas of tissue. In 1867, Lister published his preliminary paper on "The Antiseptic Principle in the Practice of Surgery"; and with the popularization of this procedure the much-dreaded hospital gangrene, puerperal fever and similar infections were apparently miraculously reduced to a minimum in surgical practice. Proper credit, however, should be given to Semmelweis and Oliver Wendell Holmes, who in the early fifties were at least partially successful in reducing the ravages of puerperal fever by employing empirically antiseptic procedures, and to Pasteur, who laid the foundation for the conception of fermentation in its relation to infectious diseases.

For the ready comprehension of the possibilities in the domain of applied medicine it is essential that we should, even if only in passing, mention an investigator whose name will be for ever indelibly engraved upon the records of medical lore—Rudolf Virchow. The revolutionary changes in the conception of the causes of diseases took place with the publication of his "Cellular Pathology" in 1858. "These lectures," as he states in the preface of this classic in modern medicine, "were particularly intended as an attempt to offer, in a better arranged form than had hitherto been done, a view of the cellular nature of all vital processes, both physiological and pathological, animal and vegetable, so as distinctly to set forth what even the people have long been dimly conscious of—namely, the unity of life in all organized beings, in opposition to the one-sided humoral and neuristical tendencies which have been transmitted from the mythical days of antiquity to our own times, and at the same time to contrast with the equally one-sided interpretations of a grossly mechanical and chemical bias—the mere delicate mechanism and chemistry of the cell."

The practice of dentistry is as old as the history of medicine and is so closely interwoven with it that it is impossible to distinguish it from its mother science. With it it had to share its trials and tribulations. Its resurrection and rehabilitation are to be credited to Fouchard, who, through the publication of his work "*Le Chirurgien Dentiste, ou Traité des Dents*," in 1728, gave the incentive for renewed activity on practical, as well as theoretical research in dental science. Prior to 1839 comparatively few important communications on dental surgery had appeared. The foremost literature of this time was published in France and England, and a few books of importance appeared in Germany. The United States was at this period principally concerned with the practical development of this new branch of the healing art, and, with the exception of the writings of Longbotham, E. Parmly, L. S. Parmly, Flagg, Trenor, Fitch, Bostwick, Spooner, S. Brown, the Burdells, and others, little was printed in relation to dentistry. Dental textbooks, if used at all, were imported from England, or translations of French works were published. Kœcker, a practitioner of international reputation, pictured the situation quite correctly when he stated, in 1826, that "in the United

States, although little or nothing has been done in the way of publishing on the subject of dental surgery, yet I feel myself authorized to say that in no part of the world has this art obtained a more elevated station." It must also be remembered that the individual practitioner of this period was extremely jealous of any special knowledge which he happened to possess, and he usually guarded this acquired proficiency very carefully. No specific current dental literature was in existence at that time, and comparatively few medical journals tried to disseminate the progress of medical and, incidentally, dental knowledge. The few journals were seriously hindered in this laudable effort by the extreme difficulties of interchange on account of the very limited facilities of the postal service. The first dental periodical of this or any other country appeared in 1839 under the name of the *American Journal of Dental Science*. The birth of dentistry as a distinct and definite profession may be recorded simultaneously with the date of incorporation of the first dental college of the world, the Baltimore College of Dental Surgery, which received its charter in 1839. Medicine and dentistry were from that year practically divorced, and, while dentistry in its early days depended very largely on medicine for its further development, it bases its fundamental studies at present on general biology exactly in the same manner as medicine, veterinary medicine, or any other branch of the healing art is forced to do.

Whether a full medical education is deemed essential for the practice of dentistry is a question too profound to be answered in a haphazard, superficial way. It is probably not amiss to repeat here what W. D. Miller had to say on this point in his last published communication read before the meeting of the International Dental Federation at Amsterdam in 1907, and which, unfortunately, has not received the wide publication which it deserves: "To demand a full medical education for a dentist for the sole reason that this would put him on a par with a physician, however desirable this may be, would be a retrograde step if thereby the time which he had to devote to special dental work were restricted and his efficiency impaired. The chief and foremost function of the dentist is to care for the teeth; and, just to the extent in which he is able to do this successfully, to the same extent will he be able to prevent diseases of the contiguous parts and materially to aid in preserving the health and vigor of the whole body. Dentistry has a most intimate relation to the science of medicine, and there is so much of medicine that the dentist should and must learn that for this very reason he should not be burdened with things which are irrelevant to his profession. Certainly the relations of the teeth to the neighboring parts, and through the nervous, vascular and lymphatic systems to remoter parts, are quite as manifold and complex as those of the eye or ear, and why should the dentist be expected to know less of anatomy than the aurist or ophthalmologist? The same question may also be asked in respect to physiology, hygiene, general pathology, bacteriology, etc. I personally would say

in answer to this question, that the science of medicine in all its branches is growing so rapidly, and has already become so extensive, that no one, even though he may have five, ten or even twenty years for study, will ever be able to master all parts of it equally well, and that it will be expedient, if not necessary, in the future that every specialist restrict himself more or less to those branches of study which have a direct bearing upon his own specialty. There is no more reason for the aurist than for the dentist to devote months to acquiring a thorough knowledge of obstetrics or gynecology, or even of the anatomy of the extremities. A great many subjects included in the curriculum of the medical student are just as superfluous for the various other specialties as they are for the dentist. The former are, however, bound by the fetters of tradition from which the dentist is free. But sooner or later they too will be obliged to break away from them and to recognize the fact that no man can master the whole of medical science, and that a thorough knowledge of those branches which are more closely connected with his specialty will serve him better than a superficial knowledge of all."

The diseases of the teeth and their adnexa can by reason of special fitness best be treated by the dentist. The oral cavity is his chosen field and Magitot's much coveted desideratum: "*Tout dentiste doit être médecin et tout médecin doit être dentiste*" will always remain a sincere wish.

From the rather extensive borderland of medicine and dentistry the writer has selected at random, for his present discourse, a few items which by virtue of their close relationship and apparently frequent occurrence may prove of mutual interest both to the oral specialist and the general practitioner.

General Disturbances Arising from Infected Teeth.—Pericementitis usually manifests itself in an acute or a chronic form. The differentiation is not so much dependent upon the period of time required for the manifestations of the respective process but upon the changes which occur in the involved tissues. In the acute form, purulent destruction of the involved areas is the most pronounced pathological sequence, while in the chronic form Nature protects herself against the invading foe in a most ingenious way by a vital response, *i. e.*, a reactive inflammation which results in the production of a fungous growth known as a granuloma, or, as it was termed in the past, an abscess sac or a pyogenic membrane. These granulomas frequently contain epithelial tissue and are often the starting point of radicular cysts. Hence, when operating upon these cysts, the cyst wall should not be closed up after draining, but the cavity should be made continuous with the epithelial lining of the mouth.

One of the most interesting early manifestations of infectious disease about the oral cavity, including the involvement of the pericementum of the teeth, is the enlargement of the lymph-nodes within the affected region. Lymph plays a very important part in the metabolic changes within

the human economy; in fact, it bears a more intimate relationship to these processes than the blood. Lymph acts as a sort of a buffer between the tissues and the blood. The animal body is guarded against the invasion of foreign substances by special protective ferments, as Abderhalden has termed these substances. These omnipresent ferments which are secreted by the cells possess specific characteristics; their primary functions consist in the breaking down of the foreign substances, *i. e.*, food, drugs, bacteria, etc., and preparing them either for absorption, or the unsuitable material is rejected to be removed by elimination. The prepared material is again assorted by the lymph-glands, and only after having finally passed muster is it allowed to enter the circulation. The principal lymph-nodes which are specially concerned with the teeth and the tissues of the mouth are situated in the anterior part of the digastric triangle near the submaxillary gland, just below the border of the mandible, and a large node is usually found near the facial artery. These nodes are not easily located, but by employing bimanual palpation, *i. e.*, by inserting the finger of one hand into the mouth near the floor of the oral cavity and using the finger of the other hand from the outside, one is usually able to feel the gland. Even the presence of lymph-spaces in the tooth pulps must be granted, although they have, until recently, offered great difficulties to their histological demonstration. However, diseases which are confined solely to the tooth pulp do not alter the lymph-nodes, but as soon as the peridental membrane is involved, swelling of the respective gland occurs, and no doubt the protective influence of their physiological action makes itself known thereby.

Serious infections of surrounding structures or even general infections from septic teeth are by no means of rare occurrence. The frequently observed ravages of osteomyelitis about the jaws are examples of such possibilities. The majority of actinomycosis infections about the face have found their gateway through a septic tooth, and the passage of tubercle bacilli through the same route is also positively established at present. Endo- and pericarditis, meningitis and septic pneumonia, having had their starting point in an innocent looking pulpitis, have been recorded. Oral sepsis by way of continuity may involve the tonsils, the pharynx, the stomach and the cervical glands. According to William Hunter, septic gastritis and toxic neuritis, and their many sequels, are common manifestations of pus absorption from a septic mouth. While these infections are usually of a mixed type, as already stated, specific infections, including syphilis, are also observed. Virulent infections from the Plaut-Vincent spirochaeta dentium and other fusiform types have been recently brought to general notice. Most favorable results in the treatment in this last mentioned disease and similar suppurative conditions in the oral cavity are obtained with Talbot's glycerole of zinc iodide (zinc iodide three parts, water two parts, iodine crystals five parts, and glycerine ten parts). From a wide experience we can recommend

this compound conscientiously to our confrères. According to Zilz, the local application of a 10 per cent. aqueous solution of salvarsan in connection with a diluted neutral hydrogen peroxide solution as a mouth-wash is of service in the treatment of the Plaut-Vincent angina.

Manifestations of Nervous Diseases in the Oral Cavity.—Certain types of nervous diseases are apt to produce specific prodromal symptoms in the mouth and the teeth, which may be of the utmost importance for the early recognition of their existence. By an early observation of these symptoms the dentist may often render an inestimable service to his patient. He may be the first observer to detect the manifestation of the existing ailment. We refer especially to the disturbances involving the trophic nervous system and particularly to locomotor ataxia and diabetes. Locomotor ataxia, also known as tabes dorsalis or posterior spinal sclerosis, indicates a chronic progressive degeneration of the dorsal columns of the spinal cord and of the sensory nerve trunks. The disease occurs principally in the male after middle life, and it manifests itself in the advanced stages by interfering with the functions of movement, accompanied by fulgurating shooting pain in the extremities, etc. In the mouth the initial sign of the former is manifested by a more or less complete analgesia of the dental pulp. The pulp may be entered into and wholly removed without the least sign of sensation. In the most progressive stages the teeth may become loose or may be lost without causing pain. Sometimes sequestration of the alveolar process occurs and, in rare cases, spontaneous fracture, usually of the mandible, may take place. Ulceration of the soft tissues near the alveoli is often observed; it may result in necrosis of the underlying bone and may lead to spontaneous opening of the antral sinus. The so-called dry sockets, *i. e.*, slow healing empty alveoli after tooth extraction should always be looked upon as suspicious prodromes of locomotor ataxia or diabetes. If the aforementioned symptoms present themselves in the oral cavity, the dentist should make an effort at once to verify the diagnosis by looking for the typical diagnostic signs of locomotor ataxia, *i. e.*, the impaired reaction of the pupils against light—the Argyll-Robertson sign; the loss of the knee-jerk—the Westphal sign; and the swaying of the body with the feet close together and the eyes closed—the Romberg sign.

Somewhat similar symptoms are often observed in the mouth as an indicator of a disease which is only partially related to the nervous system—diabetes. The term 'diabetes' primarily means 'a running through,' signifying the increased amount of urine voided during the presence of the disease. If the increased quantity of urine is the only sign of the disease, we speak of it as diabetes insipidus, while the constant additional presence of sugar indicates the more severe form, diabetes mellitus. Diabetes mellitus is a disease of impaired nutrition. Faulty metabolism, resulting from the materially reduced power of the tissues to burn up grape-sugar, is the causative factor. Post-mortem ex-

amination of diabetics usually shows very few or no morbid changes of the organs, with the exception of the brain. The sequence of this inhibition of chemical changes in the body is the presence of sugar in the blood; it results from the diminished destruction of the sugar, and, as a consequence of this incomplete oxidation, oxybutyric acid, diacetic acid and acetone are formed, which, with the sugar, are excreted with the urine. The nervous system being the controlling factor of the chemical changes in the muscle tissue, it seems proper to suspect certain disturbances which originate in the central nervous system as the primary factors of this disease.

It is well known that diabetes mellitus lessens the resistance of all the tissues of the body; gangrene and a tendency to form carbuncles are ample illustrations of this lowered vitality. Dry sockets, as referred to already, are frequently traced to existing diabetes. According to Naunyn, this pronounced tendency to local infection may be partly explained by the ever-present sugar in the tissues, thus furnishing rich food to certain forms of Schizomycetes. The presence of thrush, so frequently seen in the mouths of diabetics, may be explained on this basis. The best authorities agree that no sugar is found in the saliva of the diabetic; however, a distinct acid reaction of the oral fluids is usually observed. This acidity, to a large extent, is responsible for the increased sensitiveness about the necks of the teeth in the advanced stages of diabetes; it is the usual forerunner of rapid decay in this region. The circular ligament becomes swollen and livid, it loses its hold on the tooth, and thus opens a ready gateway to the ever-present pathogenic bacteria. The formation of pus pockets follows with concomitant destruction of the peridental membrane and necrosis of the alveolar process and final loss of the tooth, *i. e.*, typical pyorrhea alveolaris. The teeth of the upper arch are usually attacked prior to the lower teeth. The articulation of the arches is destroyed; and, as a consequence of the force which is produced by the more firm teeth of the mandible in their curve of motion against those of the maxilla, the latter readily give way and more or less prognathism or Arkoevy's diastema results. The percussion fremitus of Landgraf, which is observed by placing the finger over the root-end of the tooth and tapping the crown, forms a valuable diagnostic sign of determining the progress of destruction of the alveolar plates. Some writers have made the authoritative statement that pyorrhea alveolaris is always the sequence of diabetes. This statement is undoubtedly too sweeping, since a genuine pyorrhea may also be observed as a sequence of other predisposing factors, *i. e.*, metabolic disturbances, tuberculosis, rickets, scurvy, syphilis, chronic dyspepsia, metal intoxications, etc. In reality, the term pyorrhea alveolaris is a collective phrase; it merely indicates a complex symptomatology. From the standpoint of the clinical pathologist we would strongly urge to adopt Rhein's suggestion regarding the etiological classification

of pyorrhea alveolaris, *i. e.*, "to prefix an adjective stating the name of the disease which is causing the pathological symptoms in the oral cavity, as rheumatic pyorrhea, lead pyorrhea, etc."

The very rapid formation of calcareous deposits about the necks of the teeth in the diabetic is an important diagnostic symptom. This 'tartar' is usually of a light yellow color and it feels rather soft to the touch. The deposits are not confined to a group of teeth, but form indiscriminately all over the denture, but naturally more so near the outlets of the ducts of the salivary glands. The rapid formation may thus be partly explained: The supersaturation of the tissues with acids calls forth an increased neutralization by the alkaline earths which are largely held in solution by carbonic acid and poured out with the saliva. On coming in contact with the air, the carbon dioxide becomes liberated and the precipitated calcium salts in conjunction with precipitated mucin are deposited about the teeth. The tongue is usually found thick, of a red color, and coated, showing the imprints of the teeth. The gum papillæ are enlarged; the mucous lining of the mouth shows a livid color resulting from the hyperacidity of the blood, and the mouth is usually extremely dry. The typical odor arising from the breath of the diabetic is often readily observed by the oral specialist. It is a peculiar chloroform or acetone-like odor, resembling somewhat sweet cider. This odor is due to the acetone compounds formed in the body.

Trophic disturbances during the period of development of the teeth usually interfere with their perfect calcification. Scarlatina, rickets, very early acquired, and hereditary syphilis, etc., are productive of specific forms of hypoplasia of the enamel. Nutritional interferences after the permanent teeth are fully formed may leave their imprints upon bone, but no visible signs are observed upon the crowns of the teeth. Pathological diastema may and does occur in diseases of the thyroid gland in the adult, or, in the abnormal growth as observed in acromegalia. A marked change in the size of the jaws, usually the lower, may take place, but the teeth themselves are not affected by these alterations. Diastema and wandering of the teeth are also frequently observed in premature atrophy of the alveolar process. In athyroidism (cretinism), marked anomalies of the structure and the shape of the teeth are of common occurrence. The mere presence of so-called Hutchinson's teeth is not a sufficient criterion of an existing hereditary syphilis; they are only observed in about 25 per cent. of cases. The Hutchinson deformity, by the way, is not merely confined to the incisors and canines, but is also frequently present as a marked dystrophia in the occluding surfaces of the molars (Fournier).

As a comparatively rare trophoneurotic disturbance about the external and, less so, the internal mouth, herpes zoster should be mentioned. This vesicular eruption usually runs unilaterally along the superficial nerve trunks and is more or less accompanied by neuralgiform pain. It

is most commonly met with as a sequence of various infectious diseases; but recently it has also been observed about the mouth after an injection of salvarsan, and in a case reported by Zilz, following the eruption of a supernumerary lower canine. This tooth which, by the way, showed marked anatomical derangements causing severe pressure upon its own pulp, was relieved of the pain almost instantaneously after extraction, and the vessels dried up within a few days.

Genuine neuralgia about the teeth, with the exception of pain caused by pulpitis or pericementitis, is comparatively rare. On the other hand, referred neuralgias resulting from pressure of impacted teeth, pulp stones, and hyperplasia of cementum are among the commonest manifestations of severe pain in these particular regions. Of impacted teeth, the lower third, and less so the upper third molars are most often met with. The Ahasuerus among the permanent teeth is the upper canine. In its vicarious excursions it may erupt anywhere about the maxilla and at any age. Although fully developed, the tooth may lie dormant within the body of the jaw for years or, when irritated, may at any time start on its erratic journey to the periphery. We have had occasion to remove impacted canines from every available surface of the hard palate, from the nose, and from the antrum. In one case, the vagrant made its appearance at the age of sixty-five in an edentulous jaw over which a plate had been worn for more than thirty years. Retained teeth frequently show marked absorption lacunæ; genuine caries, however, has not been observed.

Diseases of the Antrum.—The diseases of the antral sinuses, as a sequence of disturbances about the teeth, are of very frequent occurrence. The question whether an infection of the antrum results more frequently from diseases of the teeth or from the anatomical continuity of the disturbed lining of the nose is often seriously debated. It is but natural that the rhinologist will observe a greater number of cases that are directly connected with the disturbance of the nose, while those cases that come within the province of the dentist are probably always caused by defective teeth. Judging from the observations of men, who have had wide experience in this particular field, we are probably safe in stating that nasal and dental troubles share about equal in the causation of antral disturbances. The question has been frequently asked, Is a dentist, from a professional point of view, entitled to treat antral diseases, or does the treatment of this sinus belong exclusively to the sphere of the rhinologist? As an answer we may be permitted to reiterate a statement, as given by Blair, in his recent excellent work, "Surgery and Diseases of the Mouth and Jaws": "A skilled rhinologist is the only one competent to treat diseases of the upper nasal sinuses. On the other hand, if the disease is an extension from around a tooth, it is just as important that this source of infection is eliminated. In the acute or subacute stage the most logical procedure in cases infected from the tooth is to drain

both the cavity and the diseased submucous tissues through the same opening, which can be done at least as well by the dentist or by the general surgeon as by the rhinologist." We are in full accord with this conception of our colleague. The roots of the first molar, the second bicuspid, the second molar, and, rarely, the last molar or first bicuspid are frequently found penetrating through the floor of the antrum and, as a consequence, diseases of the pulps of these teeth, by continuity, may involve the sinus. In treating the roots of these teeth, or by their extraction, the antrum is frequently entered into. Probably in the greatest majority of cases no subsequent disturbance will arise and, as a matter of fact, slight openings into the antrum are often passed by unnoticed. Acute infections, however, call for treatment which consists primarily in the repeated irrigation with a warm saline solution through the tooth sockets or, in rare instances, even through the root canal; and these efforts are usually crowned with success. Chronic infections of the antrum are rarely benefited by irrigation. They usually call for a radical operation which is preferably best attended to by the general surgeon or the rhinologist. In an attempt to extract a root, rarely a sound tooth, it may happen that the root will slip into the sinus through its thin diseased floor. This accident is of no serious consequence, provided that the root or the tooth is removed as soon as possible, otherwise infection is sure to follow. On one occasion the writer was called upon to remove a fully developed third molar with curved roots, which had slipped into the sinus in an attempt to extract it. In the modern procedure of antrum therapy the old-styled solid plugs are rarely called for. If they are required, they should be cast of pure tin or an alloy thereof (Watts metal, etc.) from a pattern obtained in the same manner as required in the construction of a gold inlay. Permanent metallic drainage tubes are relics of the past.

During the present winter, and at the same season in previous years, the writer has been consulted at various times regarding more or less pronounced neuralgiform pain in upper sound teeth, which apparently was of an idiopathic nature. The electric current usually would reveal nothing but a slight hyperemia of the pulps. Careful diagnostic inquiry, however, revealed the fact that the patient usually suffered from a severe acute form of influenza. A consideration of the close anatomical relationship of the involved antrum and the pulps of the teeth within that region suggested the possibility of a toxic irritation of the pulps from the influenza, an assumption which was corroborated by the relief obtained through proper medicinal treatment. With the cessation of the grippe infection, the pain in the teeth disappeared.

Chronic rhinitis is also known as having caused constant severe pain in the upper incisors and canines. A pertinent case, illustrating this possibility, has been recently observed by the writer in one of his colleagues. With relief from the chronic rhinitis, the recurring intolerable pains in the

upper teeth vanished permanently. Here again we should recall the close anatomical relationship of the nerve supply of the lower part of the nose and the teeth present in the intermaxillary bone. According to Clermont, the anterior superior dental branch of the superior maxillary nerve, which supplies the incisors and canines and gives off a nasal branch which supplies the mucous membrane of the anterior portion of the nasal cavity, is not enclosed deeply in the substance of the maxilla, but it runs in close proximity to the floor of the nasal cavity. In many cases the canal is really only a groove. This fact readily explains the possibility of anesthetizing the upper anterior teeth by packing the anterior nares with cotton saturated with an anesthetic solution.

Drug Exanthemata.—The ingestion of certain drugs, *i. e.*, antipyrine or migrainin, phenacetin or aspirin, and compounds thereof, occasionally produces a pronounced red rash over the entire mucous lining of the mouth and also on the skin. These rashes usually disappear readily after the discontinuation of the respective drug. Concentrated alcoholic solutions of essential oils and their derivatives, especially the oils of eucalyptus, wintergreen and peppermint or, respectively, eucalyptol, salicylic acid, salol, menthol and similar compounds when used as mouth-washes, are occasionally productive of a scaly eczematous eruption about the external mouth, especially near the corners, known as mouth-wash eczema. The prohibition of the mouth-wash and substituting a saline solution as a test, together with a simple ointment to act as a protector over the scaly surface, usually brings about quick recovery of the otherwise obstinate eruption.

In this connection it is probably not amiss to call attention to a mistaken conception regarding the therapeutic value of potassium chlorate. Potassium chlorate, as a remedy for the various forms of stomatitis, is looked upon by many practitioners as a veritable panacea. As someone has said: "It is one of the most reliable remedies, indeed almost a specific in ulcerations of the mouth, particularly in stomatitis, etc." Others have lauded it as a prophylactic in mercurial stomatitis, claiming that it will prevent salivation. Potassium chlorate has been introduced into therapeutics on the erroneous theory that it will decompose in the body and supply oxygen to the tissues. It is supposed to be largely excreted by the saliva, and thereby continuously to bathe the diseased mouth with this oxygen-laden fluid. While potassium chlorate is very readily absorbed by the gastro-intestinal tract, it does not part with its oxygen at the temperature of the tissues; in fact, it is excreted almost wholly unaltered. About 90 per cent. is removed with the urine, the remainder passing out through the salivary glands. In consequence of its resistance to decomposition in the tissues, it possesses very little, if any, value as an antiseptic, and its therapeutic effect depends probably wholly on its 'salt' action. This fact decides its worthlessness as a prophylactic in mercurial stomatitis. In the mouth it acts as a ready solvent

for accumulated mucus, and imparts to the mucous surfaces a cool saline taste. On the other hand, it should be remembered that potassium chlorate acts as a dangerous poison. When absorbed by the blood the greater part of the hemoglobin is either directly destroyed or changed to methemoglobin, and the typical picture of chlorate poisoning is, consequently, always accompanied by pronounced cyanosis. "Increased experience has also taught us that next to the potassium cyanide, it is one of the most poisonous of the potash salts which are used in medicine." The absorption of potassium chlorate from the gastro-intestinal canal occurs occasionally most rapidly. Sollmann reports a case in which death occurred within two and one-half hours after the chlorate had been taken. While the lethal dose of potassium chlorate varies very much, 15 gr. has been fatal in a child. In a case recently reported, a girl of seventeen had swallowed, during gargling, a more or less large portion of a potassium chlorate solution; within a week's time she died of typical chlorate poisoning. Quite a number of similar cases may be readily cited from the literature. Potassium chlorate in tablet form for throat trouble is in common usage by the laity; such practice should be condemned. Some years ago, Unna advocated the use of a tooth-paste containing 50 per cent. of potassium chlorate for the treatment of mercurial stomatitis. Since then this paste has been widely advertised in the United States and Europe as being a veritable panacea in all forms of mouth diseases, including, of course, the *bête noire* of all oral disturbances, pyorrhea alveolaris. Lured by the attractive advertisements, some dentists have made it a practice to prescribe this paste to their clientele for daily use. Aside from the disagreeable salty taste, the continued use of this paste is prone to produce inflamed and bleeding gum margins, which, however, usually promptly disappear on discontinuing the paste and substituting a warm 1 per cent. sodium chloride solution. Miller stated that potassium chlorate inhibits the growth of oral bacteria in a solution of 1 to 8 parts, but that the strength of this solution in which it can be used with safety in the mouth should not exceed 1 to 40. Relatively speaking, potassium chlorate is about forty times less active on oral bacteria than is borax. According to a recent investigation by Traube, it has been shown that the increase of the quantity of potassium chlorate and similar salts in their toxic effects upon bacteria does not represent a straight line, but a parabolic curve and, as a consequence, weak solutions, *i. e.*, about 5 per cent. are almost equally as effective as are stronger solutions. The empirically accredited therapeutic value of potassium chlorate is a typical example of drug idolatry. The writer has discussed this question somewhat at length, but by no means exhaustively, because he has been recently accused of being prejudiced against the drug.

While referring to mouth-washes, the following incident may be of interest to the reader. A dentist had prescribed a solution of milk magnesia as a mouth-wash. A few days later the patient reported that

the otherwise milky looking mouth-wash when ejected from the mouth always had a peculiar pink tint. We received a sample of the used mouth-wash and found that it contained traces of phenolphthalein. We informed the dentist that he should advise his patient not to worry about this "discoloration, as the pink tint was due (as we supposed by inference) to the use of 'Purgen' tablets which the patient took as a laxative. Our supposition was verified by the patient. Purgen, Prunoids, and various other compounds of this nature, contain variable quantities of phenolphthalein, which, aside from its laxative effect, is used in the laboratory as an indicator for alkalies, producing a pink color. In chewing these tablets small quantities of this compound were retained about the teeth; hence the pink reaction with the milk of magnesia. A similar observation has been related to the writer by Dr. C. E. Kirk.

Powdered vegetable charcoal, which is often found in the so-called Japanese and Chinese tooth powders, presents a mass of sharp, crystalline cylinders when viewed under the microscope, which possess marked abrasive power. When used as a component in a tooth powder, the sharp particles imbed themselves in due time into the gum tissue, producing a distinct bluish line near the gum margin which may simulate the lead line. The gum tissue becomes tattooed by the charcoal, and nothing can remove these pigmentations but a surgical operation.

Metal Intoxication.—The exhibition of metal poisoning in the oral cavity is of common occurrence. Metal intoxication may result from medicinal administration, from occupation, or from ingesting poisonous chemicals with suicidal intent. Metals in their pure state usually do not induce any serious symptoms in the living human organisms, unless their salts or oxides are formed. Soluble and insoluble salts of gold, nickel, and tin are probably not absorbed by the intestines, even if they are administered continuously for months; hence, vessels that are made from such metals, or that are covered with a continuous coating thereof, and that are used for culinary purposes are free from danger, if kept clean. Silver salts, if administered for a prolonged period, may be absorbed and deposited in a reduced form in the connective-tissue causing a gray discoloration of the skin (argyria). Lead, bismuth, and mercury salts are readily absorbed and, consequently, when administered in continuous doses, produce typical chronic intoxication—lead colic, bismuth stomatitis and mercurialism. Certain metals, as mercury, bismuth, iron, etc., are readily excreted by the lower bowels, while some metals, as mercury and bismuth, show a predilection for the diseased mucous membranes.

Mercurial stomatitis, as a sequence of prolonged administration of the various forms of mercury for medicinal purposes or as a trade disease, is at present far more rarely observed than in bygone days. The co-ordination of three essential factors is necessary for the full development of this disease, *i. e.*, mercurial intoxication, local disturbances, and bacteria. That the mercurial intoxication is not the sole agent in the causa-

tion in this disease is borne out by the fact that mild mercuric bichloride solutions have been successfully employed in the treatment of mercurial stomatitis. A portion of the absorbed mercury is excreted with the saliva, and its continuous contact with the epithelium of the mouth lowers the resistance of the mucous linings and invites bacterial invasion. Decubital ulcerations of the gum tissues follow; the tongue becomes swollen and thickly coated; and the breath assumes a foul odor, accompanied by a disagreeable metallic taste. The local disturbances are only observed in the presence of pathological foci, *i. e.*, accumulations of calcareous deposits, carious or pericementitic teeth and pockets about normal and especially partially erupted teeth. If the dose of mercury is within normal limits, mercurial stomatitis is a preventable disease. This dogmatic statement is substantiated by the absence of mercurial stomatitis in the mouths of babies, and in the edentulous mouths of the aged. If prior to and during the mercury administration extreme hygienic care of the oral cavity is rigidly insisted upon, usually no manifestations of the disease are to be observed. These facts are borne out by experimental studies of Lanz, Ritter and others. The supreme prophylactic procedures consist in the vigorous use of the tooth brush, not merely restricted to the tooth surfaces, but also employed as a massaging agent over the entire oral mucosa, in conjunction with an alkaline peroxide solution, *i. e.*, a 2 per cent. solution of sodium perborate or a hydrogen peroxide solution rendered alkaline by the addition of small quantities of borax.

General bismuth poisoning manifests itself in the mouth very much in the same manner as mercurial intoxication. A bluish-black discoloration of the gingivæ followed by gangrene of the gum papillæ and accompanied by an extremely foul odor and a metallic taste are the usual symptoms. The fatal absorption of the drug from dusting powders, from mixtures used in x-ray work, and from the Beck bismuth paste which in the last few years has been widely used in the treatment of chronic fistulas, bone abscesses, and in pyorrhea alveolaris, is a well-established fact. While comparatively large quantities of bismuth have to be absorbed to induce serious symptoms, nevertheless, even the comparatively small quantities present in Beck's paste, as employed in the treatment of pyorrhea alveolaris, are known to have produced typical toxic symptoms in the mouth. From a clinical point of view, Horsley's bone wax, or, still better, the Mosetig bone plombe offer decided advantages over the bismuth paste without possessing any of its drawbacks. The mechanical obliteration of the fistula or the pocket by means of a sterile absorbable plug seems to be the predominating factor in the rationale of this treatment.

Acute lead intoxication is rarely met with, while the chronic form is most frequently observed as an industrial disease. *i. e.*, in smelters, painters, workers in white lead factories, dye workers using sugar of lead, etc. Its characteristic evidence in the mouth, which by no means, however, is

essential for the diagnosis of the disease, is the lead line and a diffuse stomatitis with a foul odor from the breath. The bluish-black line is principally restricted to the gum margin about and between the teeth, and cannot be confused with other disturbances, except the charcoal line. In a recent work by Legge and Goadby on "Lead Poisoning and Lead Absorption," the formation of this line is described as follows: "It is undoubtedly due to the decomposition of the lead salts which have gained access to the mouth, by the sulphuretted hydrogen produced by the decomposition and putrefaction of food, epithelial debris, and other materials, which have accumulated around the edges of the teeth and in the interdental spaces. Peculiar evidence of this may often be seen in the mouths of certain persons whose parotid glands are discharging saliva which promotes deposits of calculus. Thus, one may often find merely the two first upper molar teeth on both sides of the upper jaw coated with tartar, no other teeth in the upper jaw being similarly affected. This deposit of calcium phosphate and carbonate is exceedingly porous, and becomes saturated with the products of decomposition evolving sulphuretted hydrogen in fairly large quantities. In the mouths of such persons working in lead factories a dark bluish staining of the cheek in apposition to the filthy tooth may be frequently seen, and where the rest of the teeth are free from deposit no such staining is observable. Viewed with a hand-lens, the blue line is seen to be made up of a large number of minute granules of dark color which are deposited, often deeply, in the tissue. It is a matter of importance to note that a blue line is rarely seen in the mouths of those persons who pay attention to dental hygiene: where the teeth are clean, the gums closely adherent to the teeth, and entire absence of pus and freedom from deposit, we have never seen a Burtonian line produced. Many of the so-called healthy mouths with perfect teeth have yet infected gums. In the second variety of blue line the pigmentation is not confined to the gum edge or to a band rarely exceeding a millimetre in width, as is the ordinary common blue line. In this case the whole of the gingival mucous membrane from the edges of the teeth, and extending some way into the buccal sulcus, 5 or 6 mm. or even a centimetre wide may be seen. When this phenomenon is present, it is always associated with a marked degree of pyorrhea alveolaris, the gums are soft, edematous, and pus oozes from their edges, the teeth are frequently loose, and the other symptoms of disease of the os marginum are present." Here again we may repeat what we have said about mercurial stomatitis, *i. e.*, rigid hygiene of the teeth and gum tissues will reduce the manifestations of lead intoxications in the mouth to a minimum.

A most interesting case of deposition of copper in the bones and teeth is recorded by Kobert. He received some bones and teeth which were obtained from authentic burial places of the early Greeks near Athens, and which showed marked greenish discoloration. An analysis showed

these deposits to be copper. The copper was present within the structure of the bones and teeth, and not merely as an external deposit. The presence of copper in this connection can only be explained upon the basis that during the lifetime of the individual continuous small quantities of copper were taken with the food. Such small quantities (up to $\frac{1}{32}$ of a grain per day) taken with the food do not necessarily produce symptoms of disease. This is equally true of silver, when taken for medicinal purposes. The presence of the copper in these teeth and bones may be traced to the utensils made of copper or an alloy thereof (bronze) as used in preparing and storing of the food in the early days of Greek domestic life. Very recently large quantities of colloidal copper, *i. e.*, as much as 800 c.cm., are injected in more or less continued doses for the treatment of cancer. So far no untoward effects have been observed.

THE WASSERMANN TEST IN SYPHILIS.*

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A consideration of the value of the Wassermann test in syphilis necessarily resolves itself into two questions: First, what is its value for diagnosis? and, secondly, what is its value as a gauge of the effect of treatment?

The second question includes a most important problem—namely, Can the result of the test establish the fact of permanent cure, and if so, under what conditions?

The answers to these questions must turn upon the proportion of agreements between the serum test and the clinical diagnoses, the latter being checked, when positive, by the effect of specific medication; for no matter on how sound a theory a new procedure seems to rest, it must be subjected to a comparison with already established truths before it can be accepted as independently useful.

Others have addressed themselves to this task and have furnished answers, some of which may already be accepted as final, while others must still be regarded as provisional. Our object in this communication is to furnish some additional data in the hope that we may thus aid in setting the received facts upon a firmer foundation, and help toward the final solution of those questions still under judgment. These data are taken chiefly from our service in the Department of Dermatology of Washington University Medical School, and in small part from our private work. The tests quoted were made by Drs. Tiedemann and Klenk, of the Department of Pathology, except the most recent which were made by Dr. Nicholson, of the Washington University Hospital. In all the greatest care in technique, use of controls, etc., was used.

The cases observed numbered 104, of which 65 were male and 39 female. One hundred and sixty tests were made on these, of which seventy-five were for diagnosis or as a routine measure, and eighty-five to determine the result of treatment. 61 cases clinically luetic gave fifty-five positives or 90 per cent. of agreements between the clinical and serological diagnoses.

A certain number of tests upon cases recognized as non-syphilitic are here included for their value as negative testimony.

We believe that our results show that, at least for this part of the United States where leprosy is extremely rare, and frambesia, relapsing

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fever, and sleeping sickness unknown, and when pellagra is excluded, a positive Wassermann reaction, in the absence of a recent ether-narcosis, or of approaching death, may be accepted as trustworthy evidence of syphilis. This, of course, with the understanding that the test was made by a thoroughly competent person. When the clinician is trained to the recognition of dermatoses, the narrow margin of possible error due to the occasional presence of leprosy or pellagra can be safely eliminated.

The average percentages of positive Wassermann reactions in the various stages of lues obtained by twenty observers, are as follow:—

	Number of Cases	Per cent. +
Primary Syphilis.	416	69.8
Manifest Secondary Syphilis.	1605	89.4
Manifest Tertiary Syphilis.	581	78.1
Early Latent Syphilis.	1233	51.0
Late Latent Syphilis.	861	47.0
Congenital Syphilis.	125	94.5
Cerebrospinal Syphilis.	64	47.6

Total cases, 4885.

Per cent. positive, 68.2 (Noguchi). Browning and McKenzie show 85 per cent. of positives. The writers' 61 cases of recognized lues afforded 90 per cent. of positives.

These figures may in small part assist in the elucidation of the converse problem, far more intricate and difficult of solution—namely, What is the correct interpretation of a negative seroreaction? As to the first question: They show that the serodiagnostic report in all but a few instances was fully in agreement with clinical findings and was supported by the results of specific therapy. Do the rare disagreements mean that the Wassermann reaction is not founded upon absolute laws, and therefore not altogether trustworthy, or are they not rather due (after leaving the necessary small margin of error inherent to human fallibility) to the operation of certain disturbing causes, some of which have been learned and eliminated since we began to accumulate these data? The majority of such disagreements, at most few, occurred during the earlier months of our use of the test.

Some of the disturbing factors which can convert what would otherwise be a + into a — result are now known and can be eliminated as sources of error. In our cases of disagreement the existence of such a factor as a cause was either proved or at least seemed eminently probable. One of these sources of possible error is probably permanent in the individual under investigation—namely, the presence in the blood-serum of an anti-sheep amboceptor. Others are transitory, such as recent mercurial medication or the use of alcohol. The latter is illustrated in cases XCV, XCVI, and XCVII of the table, of which condensed histories are also given below. Other sources of error are the making of the test too early after the appearance of the initial sore (Case XCVIII) and faulty methods such as delaying the deactivation of the serum, and thus permitting the formation therein of hemolysins (Case C).

During the early part of the period covered by the writers' report, about 10 per cent. of possible error was allowed in negative findings on account of the occasional presence of an anti-sheep amboceptor in the patient's serum (Case XCIV). This source of error was later excluded by additional controls devised for this purpose. It is noteworthy that this hemolysin is found most often in old, uncured cases that have had much treatment.

The behavior of the Wassermann test after prolonged mercurial treatment is shown in the table.

It will be seen that in some of the negative cases a number of years had elapsed since the cessation of treatment, and since the last observed

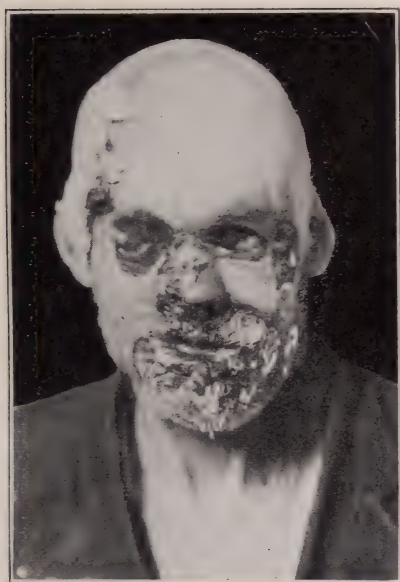


Fig. 1.

Fig. 1.—Case XVIII before injections of salvarsan. (Front view.)

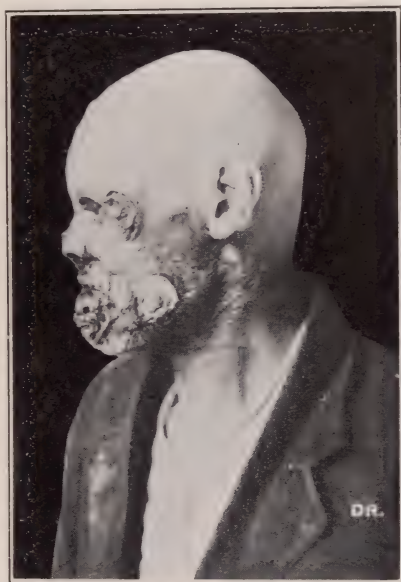


Fig. 2.

Fig. 2.—Case XVIII before injections of salvarsan. (Side view.)

symptom of disease (Cases LXXXV to XCII inclusive). These seem to prove that, whatever may be true of newer methods, many cases treated for long periods with mercury and the iodide make a true recovery as far as can be now shown by any clinical or serological criteria. Whether an extended experience with Noguchi's luetin reaction will modify this conclusion, remains to be seen. It seems probable that occasional cases recover that have received only what would ordinarily be deemed insufficient treatment. That prolonged mercurial courses, on the other hand, do not guarantee a cure is shown by Cases XVIII, XLIII, XLVI, LIX, LXXIII, LXXIV, LXXX, LXXXI, LXXXII, LXXXIII.

How many negative Wassermann findings are necessary to establish

the fact of real cure? How much time should elapse after the cessation of treatment before these tests are made? These all-important questions must necessarily await their final answers for some years to come, but the latter can be approximated with a constantly increasing approach to precision. If it could be shown that among a large number of symptomatically cured cases a negative serum test obtained, say, three years after the cessation of all treatment, and was never followed in after years by recurrence, this term of years might be accepted as conferring upon the serum-finding a fair approach to finality. Manifestly, no other evidence can be satisfactory, for since the Wassermann test in the last analysis depends for its acceptance upon



Fig. 3.

Fig. 3.—Case XVIII six weeks after second injection of salvarsan. (Front view.)

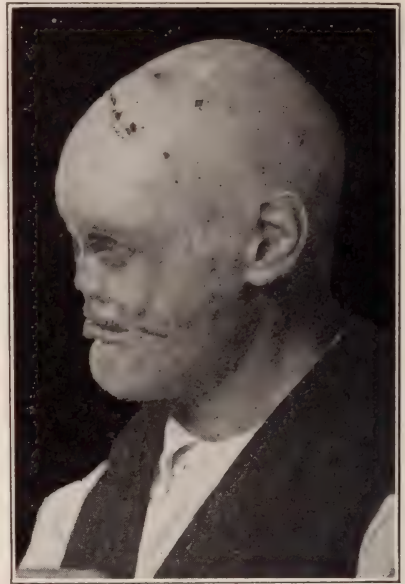


Fig. 4.

Fig. 4.—Case XVIII six weeks after second injection of salvarsan. (Side view.)

its agreement with clinical observation, one must not look for the stream to rise higher than its source. The value of this test in determining the efficiency of treatment and in deciding upon the necessity for further treatment lies in its affording immediate, albeit inconclusive, evidence which one might otherwise have to await for months or years, meanwhile remaining in a dilemma between dosing the patient perhaps unnecessarily, or in case one abstained from treatment, possibly wasting valuable time and thus losing the opportunity of a final cure.

While we have not had an opportunity of observing any case for a sufficiently long time after obtaining a negative Wassermann re-

action to justify us in formulating a final opinion, yet the constant finding of negative results in cases clinically cured and without treatment for more than three years, greatly increases the probability that such cases are really cured. This seems all the more probable when a case, which developed symptoms after years of apparent health without treatment, yields a positive finding when interrogated in the interim (Case LIX).

Of special interest is the behavior of the test after the use of salvarsan. The test was done twenty-one times on 10 cases treated with salvarsan alone:—

1 case — in two months.

1 case feeble + in two days.



Fig. 5.

Fig. 5.—Case XXXIX before injection of salvarsan.



Fig. 6.

Fig. 6.—Case XXXIX thirteen days after one injection of salvarsan.

1 case + in three days, five days, twenty-one days, twenty-seven days and forty-two days.

1 case — in five days, + after one month.

1 case + after one week.

1 case + after one week, one month, three months.

1 case + after two weeks.

1 case + after ten days.

1 case + after five days, + after two months.

1 case + after one month, three months, four months, — in eight months.

We have had 26 cases treated with salvarsan, most of which

were placed on mercury soon after, and subsequently returned for a Wassermann test. Of these, 5 cases had two doses; 4 of these showed a positive Wassermann reaction even after two doses. The remaining one gave a positive Wassermann reaction twice after the first dose and ++ one month after the second dose, and four months later a negative Wassermann reaction. 21 of the 26 cases received only one dose of salvarsan. Of these, 7 gave negatives:—

- 1 case, five days after, but became ++ four weeks later.
- 1 case, four weeks after.
- 1 case, six weeks after. (Probable error. See Case CII.)



Fig. 7.

Fig. 7.—Case LXI, gummata right ankle.



Fig. 8.

Fig. 8.—Case LXI, gummata left ankle.

- 1 case, eight weeks after.
- 1 case, three months after.
- 2 cases, four months after, 1 of which was + one month after, but three months later became —.
- 14 gave a + Wassermann reaction after one dose. 2 gave a + Wassermann reaction after one dose.

In all cases all treatment was stopped for at least three weeks prior to taking blood for the Wassermann test.

Clinical recurrence, following a negative Wassermann reaction obtained after salvarsan, was observed twice. But in one of these (Case C) there was an obvious source of error.

McIntosh and Fildes furnish the following statistics relative to the Wassermann test after salvarsan:—

1. After intramuscular and subcutaneous injections:—

In primary lues, the test became negative on an average in five weeks.

No case failed to become negative.

In secondary lues, the average time for the test to become negative was eight weeks.

One-third of the cases failed to become negative.

In early latent lues, ten weeks was the average for a negative to appear.

In tertiary lues, only one negative obtained.

In congenitally luetic infants, 2 cases became negative in twenty-three weeks.

2. After intravenous and intramuscular injections combined:—

In secondary lues, the reaction became negative on an average in six and a half weeks. No case failed to become negative.

In tertiary lues, three negative reactions were observed in 7 cases (40 per cent.).

In other forms of lues, the results were the same as those after intramuscular injections.

After an injection of salvarsan, say McIntosh and Fildes, the reaction sometimes increases in strength. This is most common after intramuscular, and seldom or never seen after intravenous, injections. It usually occurs in the secondary stage. It is not certain that the increase is due to salvarsan, but it is probable that the injection may have some stimulating effect especially in the tertiary stage. Ineffective treatment will stimulate the disease and may affect the test correspondingly in some cases.

The aforementioned facts bring up a point in connection with the reported cases of negative Wassermann reactions immediately following upon a dose of salvarsan, say in from five days to two weeks. The question arises, Does the presence of this drug in the blood cause a positive Wassermann reaction to become negative directly by its presence, or is the change due to disappearance of the Wassermann body?

Nineteen cases treated with mercury and the iodide gave twenty-four Wassermann reactions:—

2 cases + after two months.

1 case + after three months.

1 case — after eighteen months and + after two years.

1 case feeble + after eighteen months and feeble + after two years.

- 1 case + after eighteen months and + after two years.
- 1 case + after one year and + after two years.
- 1 case + after six years.
- 1 case + after eight years.
- 1 case — after one year.
- 1 case — after two years.
- 1 case — after three years, and — after four years.
- 2 cases — after five years.
- 3 cases — after six years.
- 2 cases — after eight years.

Reduction in the strength of the positive Wassermann reaction in a case of syphilis being treated with mercury, depends, according to McIntosh and Fildes, on (1) the susceptibility of the spirochætæ to mercury, their number, and probably their situation in the body. (2) The quantity of mercury absorbed or the power of the individual to utilize it in a satisfactory manner. (May this not depend on the accessibility of the spirochætæ, or on a low general condition of health, especially if coupled with mercurial treatment?) (3) The form of the application of mercury. Mercury-fast spirochætæ may be produced by too mild treatment long continued. Herein lies a danger of long-continued, mild, pill treatment. It must also be remembered that mercury-fast spirochætæ may be acquired from an individual already harboring such strains.

The especially inaccessible spirochætæ in the body are those in gummata or around nerve sheaths.

Twenty-one cases clinically diagnosed as non-syphilitic were serologically investigated, giving eighteen negatives and two positives. Of the latter, one with chancroid had had a chancre two and one-half years before. One case of tuberculosis verrucosa cutis probably had syphilis as well. One case was hemolytic to sheep corpuscles and therefore inconclusive.

Cases:—

	—	+	±
Scar of foot.....	1		
Lupus erythematosus.	2		
Leucoplakia.	1		
Varicose ulcer of leg.	1		
Cellulitis.	2		
Pruritus vulvæ.	1		
Alopecia areata.	1		
Eczema.	3		
Recurrent necrotic lesion of tongue.	1		
Tonsillitis follicular.	1		
Atrophia maculosa cutis.	1		
Tuberculosis verrucosa cutis.		1	
Chancroid.	3	1	1
	<hr/> 18	<hr/> 2	<hr/> 1

TABLE.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
I.....	M.	Chancroid?		—			
II.....	M.	Tbc. Verruc. Cut.?		+ +			Patient never returned. Luetic history doubt- ful. Tbc. of hip-joint
III.....	F.	Pruritus Vulvae		—		Local	Headache. Pruritus improved
IV.....	F.	Hystero- epilepsy		—			
V.....	F.	Cellulitis hand		—		Local	Recovery
VI.....	M.	Syphilophobia		—			
VII.....	F.	Lues? Tbc.?	Late	+ +			Improved under salvar- san and Hg. Gumma, ulcer of tibia
VIII.....	M.	Lues?			— after 3 months	Hg. oral	Vague history. Penile sore 6 months earlier; unimproved
IX.....	M.	Lues?		—			Vague history. Ven- ereal sore 7 years earlier
X.....	F.	Lues?			— after 6 months	Hg. oral	Unimproved
XI.....	F.	Lues	Late	+ + +			Patient disappeared
XII.....	F.	Lues?		—			No history of lues. Blood sheep-hemolytic
XIII.....	F.	Lues	Late	+ +			Clinical recovery after salvarsan
XIV.....	M.	Lues?		—			Palmar callosities
XV.....	F.	Lues	Late	— twice at 26 days' interval			Clinical recovery after salvarsan. See his- tory

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION			Treatment	Remarks
				Before Treat- ment	After Treat- ment			
XVI.....	M.	Lues	Late	+	+	+	1 Salvarsan and Hg. rubs.	Marked improvement after three months
						+	+ after 1 week	
						+	+ after 4 weeks	
						+	+ after 7 weeks	
						+	+ after 10 months	
XVII.....	M.	Lues					Hg. oral	Wassermann to test re- sult
XVIII.....	M.	Lues?	Late	+	+	+	1 Salvarsan. KI. Hg. oral and rubs	See history and figures 1, 2, 3 and 4
XIX.....	F.	Alopecia						
XX.....	M.	Carcinoma? Lues?		+	+			
XXI.....	F.	Eczema	Late					Tongue ulcer (gumma). No luetic history
XXII.....	F.	Optic N. atro- phy					Local	Recovery
XXIII.....	M.	Chancroid? Lues?						Fixed pupil
				— one — month interval			Local	Recovery
XXIV.....	M.	Lues? Raynaud's dis- ease	Late	+				Improved under Hg. and KI. See history
XXV.....	F.	Carcinoma? Lues?	Late	+				Ulcer of tongue; heal- ed under Hg. and KI. No luetic history
XXVI.....	M.	Lues	Late		+	+ after 8 years		Faint lesion face

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
XXVII.....	M.	Lues	Late	+	+		Patient disappeared
XXVIII.....	F.	Lues	Late	+	+		
XXIX.....	F.	Lues	Early	+	+		Patient disappeared
XXX.....	F.	Lues	Late	+	+	Salvarsan and Hg. rubs	
XXXI.....	M.	Lues	Early	+	+	Salvarsan and Hg. rubs	
XXXII.....	M.	Lues	Early	—	—	Salvarsan and Hg. inject.	
XXXIII.....	F.	Lues	Late	+	+		Patient disappeared
XXXIV.....	F.	Lues	Late	+	+		Patient disappeared
XXXV.....	F.	Lues	Late	+	+		
XXXVI.....	M.	Lues	Early	+	+		
XXXVII.....	F.	Lues	Late	+	+		Improved under salvar- san
XXXVIII.....	M.	Lues	Late		— six months interval	Hg. oral and rubs	
XXXIX.....	F.	Lues	Late	+	+	Salvarsan	Nodular lesions. Symp- tomatic cure persists one year later. See Figs. 5 and 6; also history
					+	4 days	
					+	1 week	
					+	3 weeks	
					+	4 weeks	
					+	7 weeks	

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
XL.....	F.	Lues	Late	+	— after 5 days + after 1 month	Salvarsan	Ulcerating gumma of nose. Recurrence after five months
XLJ.....	M.	Lues	Late	+	+ after week	Salvarsan	Gumma of nose. Symp- tomatic cure and re- currence after eight months
XLJL.....	M.	Lues	Late		+	Hg. and Kl.	Leukoplakia
XLJL.....	M.	Lues? Sarcoma?	Late	+	+ after week	Salvarsan, Hg. and Kl.	Gumma of ulna. Mark- ed improvement
					+ after 5 weeks		
					+ after 2 months		
					+ after 9 months		
XLIV.....	F.	Lues	Late	+	+ after month	Salvarsan, Hg. rubs	
XLV.....	M.	Lues	Late	+	+		
XLVI.....	F.	Lues	Early	+	+ after 3 days + after 10 days + after 17 days + after 21 days + after 1 month	Salvarsan and Hg. injections	Recurrence six weeks later; optic neuritis, and meningitis yield- ing to Hg. injections. See history

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treatment	After Treatment		
XLVII.....	M.	Lues	Late	—			Grouped papules face, trunk, leg. Improved rapidly under Hg. rubs
XLVIII.....	F.	Lues	Late	+		Hg. and KI.	Gumma at glabella. Symptomatic cure
XLIX.....	F.	Lues	Late		+ after 15 months	Salvarsan, Hg. and KI.	No history of chancre. Roseola. Obstinate palmar lesion. Symptomatic cure
L.....	M.	Lues	Early	+			Chancre appeared 23 days before
LI.....	M.	Lues	Early	+			No history of chancre. Roseola
LII.....	M.	Sciatica		—			Test for diagnosis
LIII.....	M.	Eczema		—		Local	Recovery
LIV.....	F.	Doubtful		—			Test for diagnosis. Recurrent lesion of tongue
LV.....	M.	Syphilophobia		—			Test for diagnosis
LVI.....	M.	Ulcus molle		—			Test for diagnosis. Local treatment. Recovery
LVII.....	M.	Syphilophobia			—	Hg. and KI.	Penile sore in 1880
LVIII.....	M.	Syphilophobia		—			Recovery
LIX.....	M.	Lues	Late		+ after 5 years — 1 year later + + 2 years later	Hg. and KI.	— Wassermann, one year after first positive, was probably due to alcohol. See history

TABLE—Continued.

Case No.	Sex	Stage	Diagnosis	WASSERMANN REACTION			Treatment	Remarks
				Before Treatment	After Treatment			
LX.....	F.	ues	Early (secondary)	++	+ + after 9 months Hg. + after 1 month from salvarsan		Hg. and KI. salvarsan between Wassermanns	
LXI.....	ues	Late		+	+			Numerous, large gumma
LXII.....	F.	ues	Late		+ after 7 months (Hg.) + after 1 year		Hg. and KI. salvarsan between Wassermanns	Lip chancre in 1887. Blood hemolytic to sheep's corpuscles. See history
LXIII.....	M.	ues	Early		+ + after 5 days + after 7 weeks + + after 9 months		Salvarsan between Wassermanns and before first Wassermann	Gummatous meningitis fifty days after second salvarsan. Yielded to Hg. injections but Wassermann remained + + +. See history
LXIV.....	F.	ues	Late (secondary)	++	++			
LXV.....	M.	ues	Early (secondary)	++	++			
LXVI.....	M.	ues	Late	+	+ after 2 weeks		None	Received salvarsan. Marked symptomatic improvement. Disappeared
LXVII.....	M.	ues	Early	+	+ + after 10 days		None	Symptomatic cure. Disappeared
LXVIII.....	M.	ues	Early (secondary)		+ after 5 weeks			Received salvarsan. Symptomatic cure. Later recurrence

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treatment	After Treatment		
LXIX.....	M.	Lues	Late (second-ary)		— after 1 month — after 5 months	Hg. and salvarsan	Apparent cure
LXX.....	F.	Lues	Early (second-ary)		— after 8 weeks	Hg.	Symptomatic cure. Received salvarsan.
LXXI.....	M.	Lues	Late	+		None	Received salvarsan. Clinical recurrence in eight months
LXXII.....	F.	Lues	Hereditary				Received salvarsan
LXXIII.....	M.	Lues	Early (second-ary)		+ after 1 year (Hg.) + after 2 weeks (salvarsan) + after 2 months (salvarsan)	Hg. and KI. salvarsan between Wassermanns	Persistent positive Wassermann after Hg. and KI., and after salvarsan
LXXIV.....	F.	Lues	Late		+ after 4 months (Hg.) + after 5 months (Hg.) + after 1 month (salvarsan)	Hg. and KI. salvarsan between last 2 Wassermanns	Clinical cure. Persistent positive Wassermann
LXXV.....	M.	Lues	Early (primary)		— after 10 months of Hg. + + after 1 year + after 1 month (salvarsan) — after 4 months (salvarsan)	Hg. and KI. Salvarsan	

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
LXXVI.....	F.	Lues	Late		+ after 6 weeks	Salvarsan	Serious eye symptoms. See history
LXXVII.....	M.	Lues	Early (prim- ary)	+	+ after 1 month	Salvarsan	
LXXVIII.....	M.	Lues	Late		+ 1 month after second salvarsan	Hg. and Kl. salvarsan (2 doses)	Third salvarsan after last Wassermann. Blood hemolytic to sheep-corpuscles
LXXIX.....	M.	Lues	Late	—	— after 3 months	Hg. and Kl. salvarsan between Wassermanns	Extra genital chancre. Late lesion left pupil fixed
LXXX.....	F.	Lues	Late		+ 17 months + 21 months	Hg. and Kl.	Mucous patch mouth seven months after last Wassermann
LXXXI.....	F.	Lues	Latent		+ + 15 1/2 months + + 24 mos.	Hg. and Kl.	
LXXXII.....	M.	Lues	Early		+ 4 years + 8 months	Hg. and Kl. salvarsan after Wassermann	
LXXXIII.....	M.	Lues	Latent (?)		+ 7 years and 2 months	Hg. and Kl.	Menieres syndrome
LXXXIV.....	M.	Lues	Latent		— 1 year and 10 months	Hg. and Kl.	Three negative Noguchi reactions previous to negative Wassermann
LXXXV.....	M.	Lues	Early		— 4 years and 7 months	Hg. and Kl.	Married three years after chancre. Healthy (?) child

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
LXXXVI.....	M.	Lues	Early		— 8 years and 5 months — 8 years and 6 months	Hg. and KI.	
LXXXVII.....	F.	Lues	Early		— 4 years and 10 months	Hg. and KI.	
LXXXVIII.....	M.	Lues	Latent		— 6 years	Hg. and KI.	
LXXXIX.....	F.	Lues	Latent		— 17 years and 5 months	Hg. and KI.	
XC.....	M.	Lues	Latent			Hg. and KI.	
XCI.....	M.	Lues	Late		— 2 years and 1 month — 2 years and 3 months	Hg. and KI.	Last treatment one year before first Was- sermann
XCII.....	F.	Lues	Early		— 6 years and 3 months	Hg. and KI.	Aphasia and hemiplegia
XCIII.....	M.	Lues	Primary		+ 1 month + 3 months + 4 months	Salvarsan be- fore Wasserman. Salvarsan between Wassermans	Lip chancre. Spiro- chaetae found. See history
XCIV.....	F.	Chancroid		Doubtful			Blood hemolytic to sheep's corpuscles. Recovery under local treatment
XCV.....	M.	Lues	Late	— date of entry + nine days later		Hg.	Returned eight months later with indurated penile sore and adeno- pathy. Old lesion still present. Then disap- peared.

TABLE—Continued.

Case No.	Sex	Diagnosis	Stage	WASSERMANN REACTION		Treatment	Remarks
				Before Treat- ment	After Treat- ment		
XCVI.....	M.	Acute yellow atrophy of liver; luetic			— 3 years and 3 months — 4 years	Hg. and KI.	Had lues three years and three months before first Wassermann. Case rapidly fatal. Hard drinker. See history
XCvII.....	M.	Lues	Early	—		Hg. and KI.	Tonsil chancre. Two glasses beer forty hours before taking blood for Wassermann. See history
XCvIII.....	M.	Lues	Early	—		Salvarsan	Noguchi reaction negative three months later. See history
XCIX.....	M.	Chancroid		+		Local	Chancre two and a half years previous to present lesion. Treatment for one year
C.....	M.	Lues	Early		— 7 months	Salvarsan	Meningitis at time of Wassermann. No alcohol. See history
CI.....	M.	Paresis post-luetic			—		Wassermann when paresis developed
CII.....	M.	Scleroderma		—			
CIII.....	M.	Syphilophobia		—			Atrophoderma maculosa
CIV.....	M.	Lupus erythematosus		—			

SELECTED HISTORIES.

CASE II.—Male, negro. Diagnosis: Tuberculosis verrucosa cutis. Tuberculosis of hip-joint. Wassermann ++. Left without treatment. Lues not excluded.

CASE XV.—White, female. Entered December 31st, 1910. Diagnosis: Lues, late. Crescentic ulcer near elbow. No recent mercurial treatment. Wassermann tests negative on January 1st, 1911 and January 27th, 1911. Cleared rapidly after one salvarsan injection. Serum probably sheep-hemolytic.

CASE XVIII.—White, male, *et.* fifty-two. Entered June 16th, 1909. Extensive ulceration of scalp and face of seven years' duration, apparently not luetic, and variously diagnosed. Wassermann test positive April, 1910 and October, 1910. Given mercury injections and iodide, but salivation and iodism prevented efficient treatment. Condition slowly grew worse. November 8th, 1910, Wassermann reaction positive. November 15th, 1910, salvarsan 0.6 grm. intramuscularly. Slow but progressive clinical improvement began. Positive Wassermann reaction remained. February 15th, 1911, salvarsan 0.6 grm. subcutaneously followed by further clinical improvement. Wassermann reaction still positive. Patient left city May 2nd, 1911, with skin lesions healed. Ten months later he was clinically well and had gained 85 lb. in weight. (See Figs. 1, 2, 3 and 4.)

CASE XXIV.—White, male, *et.* forty-eight. Arteriosclerotic and prematurely senile. Formerly drank heavily. Penile sore at twenty. No definite history of lues. Raynaud's disease commencing in autumn of 1911. February, 1912 Wassermann reaction positive.

CASE XXXIX.—White, female, married, *et.* forty. Tubercular syphilide resisting treatment for several years. October 28th, 1910, Wassermann reaction ++. Salvarsan, subcutaneously, November 1st, 1910. Five tests at intervals of one week showed Wassermann reaction ++. Continuous improvement and clinical cure. Patient disappeared, but one year later was reported still well. (See Figs. 5 and 6.)

CASE XLVI.—White, female, *et.* twenty-five. Early papular lues. Wassermann reaction positive. December 30th, 1910 received 0.6 grm. salvarsan; Wassermann reaction positive five times at intervals of one week, then +. The eruption had disappeared and the patient ceased to report. On February 27th, 1911, she returned with double optic neuritis and meningitis, which had commenced six days before with nausea, vomiting, and headache. She was put on daily mercury injections. The headaches stopped completely, and all symptoms of meningitis were gone after two weeks. The eyes slowly improved. Patient disappeared on March 27th, 1911, but returned on October 10th, 1911 with a secondary eruption. Stated that her eyes had been quite well since May. (This patient, a public woman, actively plied her trade during the whole period of her treatment, except while in hospital with meningitis.)

CASE XLVII.—White, male, general papular syphilide observed September 28th, 1911. Wassermann negative October 7th, 1911. Cleared under mercurial rubs. Unexplained.

CASE LIX.—White, male, *et.* twenty-two. Habits good. Penile chancre July, 1903, followed by small miliary papular syphilide, iritis, and double optic neuritis. Symptoms yielded to mercury, which with iodide was taken much of the time for three years. In June, 1909, after three years of apparently fine health without treatment, the Wassermann reaction was ++. Took mercury injection irregularly for some weeks, and in December, 1909, there appeared a large gumma near elbow. Reinforced mercury injections were followed by negative Wassermann reaction in July, 1910. Treatment then practically dropped, and in February, 1912, gave Wassermann reaction ++. Serum sheep-hemolytic.

CASE LXI.—White, male, *æt.* forty-five. No history of chancre. General eruption and iritis at twenty. Interval of apparent health for twenty-five years, except recently for attacks of angina pectoris. Commencing with 1908, numerous, huge, hypertrophic ulcerating gummata of upper and lower extremities. September, 1909, Wassermann reaction + +. Lesions disappeared under mercury and iodide. (See Figs. 7 and 8.)

CASE LXII.—White, female, married, never pregnant. Husband never showed symptoms of syphilis and gives negative Wassermann reaction. Lip chancre and general eruption at fifteen. No special treatment. General health poor, but no recognized symptom of lues for next twenty-eight years. In 1910 there appeared groups of gummatous ulcers about both knees. Healed under mercury and iodide, but Wassermann reaction still positive in February, 1911. Salvarsan, March, 1911. Wassermann reaction positive September, 1911. Serum sheep-hemolytic.

CASE LXIII.—White, male, entered June 6th, 1911, with lip chancre and general pustular eruption. On June 15th, 1911, 0.6 gm. salvarsan. June 20th, Wassermann reaction + + +. July 18th, 0.6 gm. salvarsan. On August 2nd, Wassermann reaction + + +. Fifty days after second dose of salvarsan, patient developed double choked disc and gummatous meningitis, and was at once put on 0.2 gm. benzoate of mercury injections, daily. The meningitis and choked discs disappeared in two weeks. Mercurial injections were continued twice a week until February 1st, 1912. March 12th, 1912, Wassermann reaction + + +. Patient clinically well. Now on mercurial injections.

CASE LXXVI.—White, female, *æt.* forty-five, married. No history of chancre. January, 1911, roseola and lenticular papular eruptions. Salvarsan, February, 1911. Rapid disappearance of lesions. March, 1911, Wassermann reaction positive. August, 1911, double brachial neuritis. September, double optic neuritis, followed by iritis and episcleritis. Little improvement under mercury and the iodide, but later improved after two more salvarsan injections.

CASE XCIII.—White, male, *æt.* thirty-two, habits good. Lip chancre, January, 1911. Spirochætae demonstrated. January 30th, 0.6 gm. salvarsan. February 28th, Wassermann reaction positive. April 11th, Wassermann reaction + +. April 18th, 1911, 0.6 gm. salvarsan. May 15th, 1911, Wassermann reaction positive. During June and July, mercurial injections and iodide. September 12th, Wassermann reaction negative. December, mercurial injections, notwithstanding which mucous patches appeared on the palate and tonsils in January, 1912.

CASE XCV.—White, male. Diagnosis, tubercular syphilis of thigh. February 9th, 1911, Wassermann reaction negative. February 18th, 1911, Wassermann reaction positive (feeble). Addicted to alcohol.

CASE XCVI.—White, male, *æt.* twenty-one. Frequent sprees. September, 1906, penile chancre and roseola. Took mercury and iodide irregularly, and two years later developed pulmonary gummata, closely simulating tuberculosis (cough, expectoration, fever, night-sweats, rapid emaciation, hemoptysis and physical signs). No bacilli. Symptoms all disappeared under reinforced mercury and iodides, and good behavior. December, 1909, Wassermann reaction negative. September, 1910, after relapse to evil conduct, developed a rapidly fatal malignant jaundice. Wassermann reaction negative a few days before death; probably test vitiated by use of alcohol.

CASE XCVII.—White, male, *æt.* twenty-six. Tonsillar chancre. After three weeks, Wassermann reaction negative. Patient has a long standing albuminuria. Three weeks after Wassermann test, developed roseola yielding to mercurial injections. Drank two glasses of beer forty hours before blood was drawn.

CASE XCVIII.—White, male. Penile chancre, March 1st, 1911. Fifteen days

later Wassermann reaction negative. About April 15th, roseola rapidly yielding to salvarsan. June 11th, Noguchi reaction negative. (Blood probably drawn too soon after appearance of chancre.)

CASE XCIX.—White, male. Diagnosis, chancroid. Wassermann reaction positive. Later investigation showed evidence of true chancre two and a half years before.

CASE C.—White, male, *æt.* twenty-two. Habits good. Penile chancre, June, 1910. Roseola. Mercurial injections. April, 1911, salvarsan. June, Wassermann reaction positive; July, salvarsan. August 14th, 1911, developed nocturnal headaches for which large doses of migraine tablets were taken. No alcohol for a month previous. August 16th, Wassermann reaction negative. Headaches continued to grow worse and symptoms of grave meningeal syphilis developed, finally relieved by vigorous mercury and iodide treatment. (In this case blood was collected in another city and brought here during hot weather. Deactivation probably too long delayed.)

STONE IN THE ANTRUM OF HIGHMORE.*

By NORMAN B. CARSON, M. D., of St. Louis.

I report this unique case for the reason that nowhere in the literature can I find mention made of one just like it.

J. B., white, male, *æt.* sixty-seven, German, farmer. Entered the St. Louis Mullanphy Hospital on May 5th, 1912, having been referred by Drs. Alt and Sluder on account of a tumor involving the antrum of Highmore, which caused a decided enlargement of the cheek, exophthalmos of the left eye as well as a bulging downwards of the roof of the mouth on that side. The tumor was very painful. *Family history*, negative.

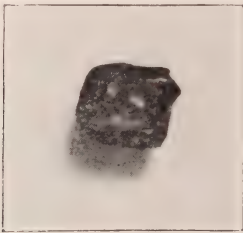


Fig. 1.



Fig. 2.

Fig. 1.—Calculus from antrum of Highmore. Section through centre of calculus.

Fig. 2.—Surface of calculus.

Early history, negative. No venereal history. Habits, good; drinks a glass of beer occasionally. Bowels regular; urination regular. *Past history*.—Nose blocked on left side for the past two years. Eye has been more or less prominent for three years or more, and very red and congested. Entirely blind in the left eye, and could not sleep at night on account of 'pressure pains' in the jaw and cheek. *Physical examination*.—Large-framed, well-developed man, 5 ft. 10 in. in height. Head well formed; hair brownish gray; eyes gray, the right reacting to light accommodation. Chest well formed, and contents normal except for increased resonance on both sides. Abdomen normal. Hernia in the right inguinal gave no trouble. Reflexes normal. Blood count: red, 7,000,000; white, 9,000; hemoglobin, 80 per cent.; polymorphonuclears, 68 per cent.; large mononuclears, 5 per cent.; lymphocytes, 25 per cent.; eosinophiles, 1 per cent. Urine normal. Phenosulphophthalein test, color appearing in fifteen minutes; first hour gave 125 c.cm. (67 per cent.); second hour 50 c.cm. (22 per cent.); total 89 per cent. Blood pressure: systolic, 160; diastolic, 63. Pulse 90.

*Reported at the St. Louis Surgical Society, May, 1912.

Operation, May 8th, 1912. Anesthesia: ether by the intratracheal insufflation method. A flap on the cheek was turned out, exposing a tumor in the antrum, the anterior wall of which had been destroyed. To the inner side, just above the alveolar border, was a hard, black, irregular stone about the size of the end of the little finger. The entire superior maxilla with the eye was removed, together with several hard polypi from the nasal cavity. The wound was packed with iodoform gauze, and the flap replaced and sutured with silk and catgut. The stone after removal presented very much the appearance of a gall-stone on the surface, and on being resected it looked like a very hard black shell about $\frac{1}{8}$ in. in thickness, filled with a lighter yellowish, coarsely-granulated mass.

The pathological report made by Dr. Thomas, of the Pathological Department of Washington University Medical School, follows:—

Gross Examination.—The specimen consists of an irregular mass of tissue about 7 cm. in all its diameters. A greater part of the specimen is composed of a firm, hard tissue; on section it cuts with resistance. The cut surface is opaque, yellowish white in color, having many irregular yellow dots and lines slightly elevated. A portion of the superior maxilla and several polypoid growths, soft and juicy, measure about 1 to 1.5 cm. in diameter.

Microscopical Examination.—The large tumor mass is composed of groups of large epithelial cells surrounded by connective-tissue infiltrated with polynuclear leucocytes. Most of the epithelial cells have large vesicular nuclei and faintly-staining protoplasm. Many nuclei are in a stage of division; others appear degenerated. In places, the stroma is quite dense and infiltrated with lymphoid cells and plasma cells; but, as a rule, it is rather scant and contains immense numbers of polynuclear leucocytes. A section from the tissue attached to a portion of the superior maxilla shows connective-tissue and fat invaded by these same cells. A section from one of the polypoid growths gives the picture usually described as a nasal polyp, with the difference that in this instance the growth is being invaded at its base by the epithelial nets described above.

Diagnosis.—Squamous-celled epithelioma.

Note.—The calculus removed from the antrum of Highmore is made up almost entirely of calcium phosphate.

A NOTE ON THE PHYSIOLOGY OF FAINTING.

By LOGAN CLENDENING, M. D., of Kansas City, Mo.,
Instructor of Internal Medicine in the University of Kansas.

The literature upon syncope or fainting is not large. Allbutt in his "System of Medicine" has a short article incorporated in the chapter on "Functional Disorders of the Heart." In this he sums up the theory which has always been current as the cause of fainting—namely, a temporary cerebral anemia due either to a systole of the heart or, in the case of "the ladies who are carried out into the vestry," to an expansion of the cutaneous or splanchnic vessels.

The writer within the past two years has had two interesting experiences which correlate each other and perhaps throw some light upon the physiology of the condition.

In both instances, during a life insurance examination, the applicant has fainted; once while the pulse was being counted and once while the blood-pressure was being estimated.

The first case was in a young man of perfectly healthy appearance. He was twenty years of age. There was nothing of importance in his previous history or family record. He was standing beside the writer's desk while his pulse was being counted. The writer's eyes were naturally upon his watch. He had counted perhaps half a minute when the pulse suddenly stopped; it had been a large, rapid, bounding pulse, and there was no intimation of weakness or irregularity up to the time when it abruptly ceased. So sudden was the transition that the writer thought the artery had rolled from beneath his fingers, and, as he tried to recover it, he felt a tug upon his arm and looked up to find the young man with blanched face and quivering eyelids swaying from side to side, in a moment to tumble in a heap at his feet. On a later examination the patient's heart and urine were found normal, and there was no other reason for refusing his application for insurance.

The second experience was with a man of thirty-two who was brought to the writer by an agent of a life insurance company for his opinion upon him as a risk. He had been refused by another company one year previously for albuminuria. He was a man of splendid physique, with no discernable gross lesion of the heart, and a urine which the writer then found to contain neither albumin nor casts. His blood-pressure was then estimated; he was seated at the side of the writer's table and a mercury column instrument used. The writer was looking, then, at the mercury column and away from the applicant as he released the pressure in

the cuff. The column came down to 60 mm., and as he felt no pulse he glanced at the applicant just in time to catch him as he pitched forward on the desk with complete loss of consciousness. It is of interest in connection with this case that Allbutt quotes Dukes as saying that school-boys who faint in chapel have albuminuria.

From these two observations one might argue that in syncope the heart, for a brief period, entirely stops beating; that in consequence there is an enormous lowering of general blood-pressure. This, according to the classic researches of Hill, would cause an immediate cerebral anemia and loss of consciousness.

AMEBIC DYSENTERY WITH SPECIAL REFERENCE TO THE
IPECAC TREATMENT.

By JESSE S. MYER, M. D., and JEROME E. COOK, M. D., of St. Louis

In reporting these cases of amebic dysentery we desire to present a brief review of the status of the ipecac treatment of the affection. The first case of amebic dysentery on record in this country was reported by Osler¹ in 1890. Prior to the Spanish-American War the disease was little known here and attracted scant attention. Since that time, and probably as the direct result of the acquisition of considerable territory in the tropics with the commercial and social relationships thus established, the condition has been reported with increasing frequency and from all sections of the country. One of the writers² had occasion in 1902 to record a case in a man who was a resident of St. Louis and had been so for several years previous to the onset of the trouble. In 1909 Patterson³ reviewed the literature with the purpose of determining the geographic distribution of the disease in this country, and was able to bring together reports from twenty-five states as widely separated as Maine, Florida, Texas, Illinois, Michigan, and Montana. About the same time Simon⁴ reported 50 cases from New Orleans.

As a clinical entity the disease has been known for only a comparatively short time. Lœsch⁵ in 1875 discovered the amebæ in the stools of a dysenteric patient, and later (in 1886) Kartulis⁶ reported a series of 150 cases from Egypt, the amebæ having been found in all. Unfortunately, however, little distinction was made in point of treatment between the cases of amebic dysentery and those other forms which for convenience we shall group under the term 'bacillary.' Even as late as 1903 Manson⁷ writes: "The drugs which have proved of most service in the treatment of severe dysentery are ipecac, one of the aperient sulphates, opium and calomel. In every case one or the other ought to be exhibited at once. Strange to say, ipecac, which has been found so serviceable in India, Africa, the Brazils and elsewhere, has a very poor reputation as an anti-dysenteric in the United States, facts pointing to specific differences in the dysenteries of different countries." And Anders,⁸ in the same year, speaks of dysentery as an entity from the standpoint of treatment, though he mentions ipecac and cites the results of Strasburger.⁹ This observer had excellent results from ipecac in amebic dysentery, but not in other forms, and expresses the opinion that the better results with ipecac in

the tropics are due to the fact that tropical dysentery is usually amebic, while in the more temperate climes the bacillary form predominates.*

Later in 1907, Sandwith¹⁰ emphasizes the necessity of distinguishing for therapeutic purposes between the bacillary and amebic dysentery, says that ipecac is not useful in the bacillary form, and quotes Manson¹¹ as recommending ipecac in the amebic form. Manson gave the drug in doses of 30 gr. at night preceded by opium, diminishing 5 gr. each day until 5 gr. is reached, which dose was then continued for ten days. Sandwith finds this excellent practice.

Many observers have since confirmed the value of the drug when used in amebic dysentery; and testimony in its favor is constantly growing, though there are some dissenters. It seems, therefore, that we are arriving very near to the unraveling of that peculiar tangle of recorded observations extending back over two hundred and fifty years, which have to do with the therapeutic value of ipecac in dysentery. MacPherson¹² in a very interesting paper gives us a brief history of the drug. According to him, the Europeans early in the seventeenth century discovered it as a native remedy in Brazil where it had the reputation as a sovereign remedy in fluxes. Helvetius, a physician of Rheims, keeping the remedy secret cured the French Dauphin of dysentery and sold the drug to Louis XIV for 1000 louis d'ors. The secret of the remedy's nature became known in 1690, and its fame grew rapidly. In 1757 Geoffrey, in his materia medica, states that it is very valuable, especially in dysentery of long standing, but that observers are well agreed that it does not succeed equally well in all forms and stages of the disease. Many other opinions of ipecac of rather wide divergence are also cited. "It would seem," says McPherson, in conclusion, "that at the end of two hundred years the profession has not quite made up its mind as to its value."

In reviewing the more recent literature, especially that of the past six years, one is struck by the almost uniformly favorable reports of the ipecac treatment of amebic dysentery. Occasionally an author takes his stand against it. Thus Axisa¹³ in a recent article dismisses the remedy with a few words: "Finally, it should be added that many practitioners prescribe ipecac because they regard it as a specific. Nevertheless, it is perfectly useless in amebic dysentery." Cooke¹⁴ likewise lays all stress upon local treatment, irrigations and, when other means fail, appendicostomy, and says that the good results attributed to ipecac are due to the aforementioned coincident treatment. On the other hand Brem and Zeiler,¹⁵ Rogers,¹⁶ Gage,¹⁷ Dock,¹⁸ and Simon report uniformly good results in a fairly extensive series of cases. Anders and

*That the ipecac treatment of dysentery was by no means uniformly successful even in the tropics, and especially in India where it gained so much of its modern reputation, is attested by the *Indian Medical Gazette* (July, 1905) which is entirely devoted to the subject. Various drugs and methods of treatment for dysentery are proposed.

Rodman,¹⁹ while impressed with the value of the drug in most instances, find it unsatisfactory in some long protracted, relapsing cases.

The cases here reported were treated with ipecac pills coated with salol, as suggested by Roberts,²⁰ Dock, Simon and others. This obviates the necessity of preceding the drug with opium to prevent vomiting, as the salol prevents the absorption of the ipecac until well into the small intestine. No untoward symptoms have resulted from the use of the drug. Less favorable terminations are to be expected when such complications as amebic liver abscess exist.

Recently Rogers²¹ has reported a number of cases of amebic dysentery, some of great severity, in which the hypodermic use of emetine hydrochloride in $\frac{1}{3}$ gr. doses, twice daily, was followed by prompt recovery. He also obtained favorable results with amebic abscesses, a thing which the oral administration of ipecac does not accomplish according to the observations reported. This method of administration certainly seems worthy of trial. Rogers was influenced by the work of Vedder²² who found that the fluid extract of ipecac even in high dilutions (1:50,000) had a destructive action upon certain nonpathogenic amebæ cultivated *in vitro*. The work of Dock and Lyons^{23 24} along similar lines has given negative results. The disparity may be due to the fact that they were working with different varieties of amebæ and that all amebæ are not equally sensitive to ipecac.

CASE I.—L. J., black, *æt.* twenty-three, entered Washington University Hospital, November 1st, 1911. Past history unimportant. First attack of diarrhea five years previous while living in Chicago; four to five bloody stools a day. Since that time had similar attacks three or four times each month with cramps and severe tenesmus. Has at times passed stools consisting entirely of red blood and mucus, has had as high as fifteen stools in twenty-four hours. Little loss of weight. Physical examination showed nothing unusual. A rectal tube was passed, and the mucus adhering on withdrawal was examined; motile amebæ were found, also a large number of trichomonas. Amebæ were found each day until November 5th. On November 6th, salol-coated ipecac pills were given, 10 gr. each hour until 60 gr. had been administered. No nausea. Amebæ were found on the following day, and not subsequently. Ninety grains of ipecac were given on November 15th, with no discomforting symptoms. The stools slowly improved in character. On November 18th, the stools were free from blood and mucus, patient felt well, had gained 5-6 lb., and was permitted to leave the hospital. The patient was seen five months later, feeling entirely well, no bowel disturbance since leaving the hospital.

CASE II.—C. A., *æt.* thirty-nine, entered Washington University Hospital, February 20th, 1912. Past history unimportant. Diarrhea started in June, four and a half years previous; six to ten stools of dark mucus and blood with much griping. Continued for nine months with remissions, exacerbations; lost 26 lb. in weight, though appetite continued good. Each summer symptoms were some better, only to return with renewed vigor in winter. On entrance he was having one to five bloody stools a day with much tenesmus and was much emaciated. Mucus obtained by means of the proctoscope showed numerous motile amebæ, some containing red blood-cells. Rectal mucosa very red, edematous, and with punctate ulcerations. Examination very painful. Amebæ were

found in the stool each day until February 27th. On that day 60 gr. of salol-coated ipecac were given. Two days later the first formed stool was passed, coated with bloody mucus. On March 4th, 70 gr. of ipecac were given. March 13th the proctoscope showed a slightly red, but otherwise normal mucosa; stools entirely normal, patient left hospital. Written communication on May 14th says patient is "feeling fine" and at work on a farm. Subsequent inquiry has failed of reply.

CASE III.—J. R., seen December 23rd, 1909, was having frequent attacks of diarrhea, four to six stools, occasionally with blood and mucus, uninfluenced by tannigen treatment. Amebæ found in mucus removed through the proctoscope. 100 gr. of salol-coated ipecac were given during a period of two weeks. The stools returned to normal, and have remained so to date.

CASE IV.—M. J. B., three and a half years ago developed a diarrhea for which he could assign no cause; three to eight stools with much tenesmus, stools watery, sometimes with mucus and blood. Amebæ were found on February 21st, 1907. The patient was having a number of liquid stools each day. Poultices, opium and quinine irrigations were without effect. Much bloody mucus was passed. On March 5th salol-coated ipecac 5 gr. three times a day, and continued. March 10th, first solid stool without mucus or blood was passed. The stools continued formed; when patient left hospital, March 23rd, he was taking cascara to obtain bowel movements. Has remained well up to the present time.

CASE V.—G. D., seen on December 8th, 1909. Five months previous in Mexico developed a persistent diarrhea; was getting his drinking water at that time from an irrigation ditch; three to four movements a day with blood and mucus. Proctoscope on December 8th, 1909 showed highly inflamed mucosa covered with bloody mucus, in which were found motile amebæ. Patient was having three to five liquid stools a day. On December 9th, 18 gr. of ipecac given; half the amount was given next day and the drug then discontinued. 18 gr. were again given December 18th and 19th. Stools returned to normal; left hospital December 22nd, having gained 10 lb. in weight. Three months later stools continued entirely normal and had remained so up to six months ago when patient was last heard of.

CASE VI.—C. T., male, seen on February 26th, 1910. Previous history unimportant. When first seen had been having six to ten stools a day with much pain. This had lasted for six months, during which time he lost 70 lb. in weight. In the bloody mucus which he passed were found numerous motile amebæ. Ipecac was administered intermittently from February 27th to March 13th. On March 10th stool became formed and of normal appearance and continued so. Gained 14 lb. in weight before leaving hospital March 23rd. There has been no return of the dysentery to date.

Summary.—While 6 cases is a small number, the uniformly prompt and lasting results obtained in a disease which is so notoriously resistant to treatment other than ipecac is surely worthy of notice. As can be seen by the earlier cases, very large doses of ipecac are not always necessary to secure therapeutic results, though they are perhaps advisable, since the drug is well borne if administered with a salol covering.

The writers wish to express their thanks to Prof. George Dock, in whose wards at Washington University Hospital they had the privilege of observing 2 of the cases here reported.

BIBLIOGRAPHY.

- ¹ Osler (*Bulletin Johns Hopkins Hospital*, May, 1890).
- ² Myer (*Med. Bulletin Washington University*, April, 1902).
- ³ Patterson (*Amer. Journ. Med. Sciences*, August, 1909).
- ⁴ Simon (*Journ. Amer. Med. Assoc.*, November 6th, 1909).
- ⁵ Loesch (*Virchow's Archiv.*, LXV, p. 196, 1875).
- ⁶ Kartulis: Dysenterie (Ruhr). Alfred Hoelder, Wien. 1896.
- ⁷ Manson: Tropical Diseases. Wm. Wood and Co. 1903.
- ⁸ Anders (*Journ. Amer. Med. Assoc.*, August 22nd, 1903).
- ⁹ Strasburger (*Muench. med. Wochenschr.*, September 9th, 1902).
- ¹⁰ Sandwith (*Lancet*, December 7th, 1907).
- ¹¹ Manson: Lectures on Tropical Diseases—Lane Lectures for 1905. W. T. Keener and Co., Chicago.
- ¹² MacPherson (*Proceedings of Med. Soc. of London*, Vol. VIII, 1885).
- ¹³ Axisa (*Archiv fuer Verdauungskrankheit.*, Vol. XVI, p. 667).
- ¹⁴ Cooke (*Journ. Amer. Med. Assoc.*, February 19th, 1910).
- ¹⁵ Brem and Zeiler (*Amer. Journ. Med. Sciences*, November, 1910).
- ¹⁶ Rogers (*Philippine Journ. of Science*, July, 1910).
- ¹⁷ Gage (*New York Med. Journ.*, December 4th, 1909).
- ¹⁸ Dock (*New York Med. Journ.*, July 10th, 1909).
- ¹⁹ Anders and Rodman (*Journ. Amer. Med. Assoc.*, February 12th, 1910).
- ²⁰ Roberts (*Journ. Amer. Med. Assoc.*, April 11th, 1903).
- ²¹ Rogers (*British Med. Journ.*, June 22nd, 1912 and August 24th, 1912).
- ²² Vedder (*Bulletin of Manila Med. Soc.*, May 20th, 1911).
- ²³ Dock and Lyons (*Trans. Assoc. Amer. Phys.*, 1910).
- ²⁴ Lyons (*New Orleans Med. and Surg. Journ.*, June, 1912).
- ²⁵ Craig: The Parasitic Amebæ of Man. Lippincott. 1911.
- ²⁶ Fitcher (*Journ. Amer. Med. Assoc.*, August 22nd, 1903).
- ²⁷ Ewart (*Lancet*, May 3rd, 1884).

MEDICAL AND SURGICAL PROGRESS.

VACCINE AND SERUM TREATMENT OF PNEUMONIA.

A REVIEW OF RECENT LITERATURE.

By WM. ENGELBACH, M. D., of the Editorial Staff.

1. Agar: Unresolved Pneumonia in a Child Treated by Mixed Vaccines. (*Long Island Med. Journ.*, October, 1910.)
2. Anderson (*Journ. Amer. Med. Assoc.*, p. 697, August 31st, 1912).
3. Batten: Double Pneumonia with Childbirth; Pulmonary Infarcts; Injection of Vaccine of Mixed Pneumococcus; Recovery. (*Lancet*, May 22nd, 1909; abs. *Journ. Amer. Med. Assoc.*, p. 2025, June 19th, 1909.)
4. Brunning: Negative Results of Serotherapy of Pneumonia in Children. (*Deutsch. med. Wochenschr.*, October 21st, 1909.)
5. Brunning: Serum Treatment of Pneumonia in Children. (*Deutsch. med. Wochenschr.*, Vol. XXXIV, No. 16, 1908.)
6. Charteris: Treatment of Pneumonia by Polyvalent Stock Pneumococcus Vaccine. (*Glasgow Med. Journ.*, Vol. LXXVII, No. 1, January, 1912.)
7. Cole: The Nature of Intoxication in Pneumonia. (*Journ. Amer. Med. Assoc.*, p. 138, July 13th, 1912.)
8. Cole: Toxic Substances Produced by Pneumococcus. (*Journ. Amer. Med. Assoc.*, December 7th, 1912.)
9. Cole: Blood Cultures in Pneumonia. (*Bulletin Johns Hopkins Hospital*, Vol. XIII, pp. 135-136, 1902.)
10. Craig: Pneumonia in the Aged, Treated with Pneumococcus Vaccine; Recovery. (*Med. Record*, February, 1910; abs. *Journ. Amer. Med. Assoc.*, p. 738, February 26th, 1910.)
11. Crux: Twelve Cases of Pneumonia in Children Treated with Rømer's Serum. (*Deutsch. med. Wochenschr.*, Vol. XXXIV, p. 16, 1908.)
12. Crux: The Serum Treatment of Pneumonia. (*Deutsch. med. Wochenschr.*, April 16th, 1908.)
13. Dorendorf: The Intravenous Application of Rømer's Serum in Croupous Pneumonia. (*Med. Klin.*, Vol. VIII, No. 38, pp. 1531-1568, September 22nd, 1912.)
14. Epstein: Hiss and Zinsser's Textbook of Bacteriology, p. 178.
15. Freeman: Serum Treatment of Pneumonia. (*Amer. Journ. Dis. Children*, Vol. 4, No. 6, December, 1912.)
16. Freeman: Serum Treatment of Pneumonia. (*Journ. Amer. Med. Assoc.*, No. 2, p. 140, July 13th, 1912.)

17. Geronne: Treatment of Pneumonia by Means of Neufeld-Handel's Serum. (*Berl. klin. Wochenschr.*, Vol. XLIX, No. 36, pp. 1689 and 1732, September 2nd, 1912.)
18. Harris: Therapeutic Value of Pneumococcus Vaccine in Pneumonia. (*British Med. Journ.*, June 26th, 1909.)
19. Hirschfelder: The Production of Active and Passive Immunity to the Pneumococcus with a Soluble Vaccine. (*Journ. Amer. Med. Assoc.*, Vol. LIX, No. 15, p. 1373, October 12th, 1912.)
20. Hiss and Zinsser (*Journ. Med. Research*, Vol. XIX, No. 3, p. 321, 1908.)
21. Knauth (*Deutsch. med. Wochenschr.*, No. 12, 1905.)
22. Kuhnau: The Usage and Results of Bacteriological Examination as an Aid to Clinical Diagnosis. (*Zeitschr. fuer Hyg. und Infektionskrankh.*, Vol. XXV, p. 492, 1897.)
23. Kriske: Serum Therapy in Croupous Pneumonia. (*Med. Klin.*, Vol. IX, p. 1881, 1912.)
24. Lamar and Meltzer (*Journ. Exper. Med.*, Vol. XV, p. 133, 1912.)
25. Leary: Vaccine Treatment of Lobar Pneumonia. (*Boston Med. and Surg. Journ.*, November 11th, 1909.)
26. Linderstern (*Muench. med. Wochenschr.*, No. 39, 1905).
27. Lyall: Blood Cultures in Pneumonia. (*Journ. Amer. Med. Assoc.*, No. 24, p. 1841, June 15th, 1912.)
28. May: Roemer's Pneumococcus Serum in Croupous Pneumonia. (*Muench. med. Wochenschr.*, October 6th, 1908.)
29. May: Action of Roemer's Antipneumococcus Serum in Croupous Pneumonia, with Special Regard to the Leucocytes. (*Muench. Med. Wochenschr.*, October 13th, 1908.)
30. Meltzer (*Journ. Amer. Med. Assoc.*, p. 697, August 31st, 1912).
31. Monte: Treatment of Pneumonia with Antipneumococcus Serum. (*Archiv fuer Kinderheilk.*, Vol. XLIX, Nos. 1 and 2, 1912.)
32. Monti (*Archiv fuer Kinderheilk.*, Vol. XL, p. 45, 1908).
33. Prochaska: Bacteriological Blood Examination in Pneumonia. (*Zentralbl. fuer inn. Med.*, Vol. XXI, p. 1145, 1900.)
34. Raw: Value of Pneumococcus Vaccine in Treatment of Pneumonia. (*Lancet*, Vol. I, No. 4619, pp. 629 and 704, March 9th, 1912.)
35. Riesman and Kolmer: Studies in Experimental Pneumonia. (*Journ. Amer. Med. Assoc.*, Vol. LVIII, No. 23, p. 1776, June 8th, 1912.)
36. Robertson and Illman: Value of Bacterins in Pneumonia. (*Penn. Med. Journ.*, Vol. XV, No. 4, January, 1912.)
37. Rosenow: Nature of Toxic Substance from Pneumococci. (*Journ. Infectious Dis.*, Vol. LI, No. 2, pp. 141 and 293, September, 1912.)
38. Rosenow and Arkin: Action on Dogs of Toxic Substances Obtained from Virulent Pneumococci and Pneumonia Lungs. (*Journ. Infectious Dis.*, No. 3, p. 295, November, 1911.)
39. Rosenow: Studies in Pneumonia and Pneumococcus Infections. (*Journ. Infectious Dis.*, Vol. I, p. 280, 1904.)
40. Shottmueller: The Etiology of Croupous Pneumonia. (*Muench. med. Wochenschr.*, Vol. LII, p. 1425, 1905.)
41. Sill: Serotherapy of Pneumonia in Infants and Young Children. (*Med. Record*, April 22nd, 1911.)
42. Silvestrini and Sertoli: The Presence of Fränkel's Diplococci in the Blood in Pneumonia. (*Riforma Med.*, Vol. II, p. 483, 1899.)

43. Sittmann: Bacterioscopic Blood Examination. (*Deutsch. Archiv fuer klin. Med.*, Vol. LIII, p. 323, 1894.)
44. Stewart: Use of Vaccines in Treatment of Pneumonia. (*Journ. Amer. Med. Assoc.*, April, 1910.)
45. Stoner: A Résumé of Vaccine Therapy. (*Amer. Journ. Med. Sciences*, Vol. CXXI, p. 186, 1911.)
46. Strouse and Clough (*Bulletin Johns Hopkins Hosp.*, Vol. XXI, pp. 233-235, 1910).
47. Tunher (*Wien. med. Wochenschr.*, No. 11, 1906).
48. Wadsworth (*Journ. Amer. Med. Assoc.*, Vol. LVIII, No. 23, p. 1777, June 8th, 1912).
49. Warden (*Journ. Amer. Med. Assoc.*, No. 23, p. 2085, December 7th, 1912.)
50. Willcox (*British Med. Journ.*, October 9th, 1909).
51. Wolf (*Journ. Infectious Dis.*, Vol. III, p. 446, 1906).
52. Wolf (*Journ. Amer. Med. Assoc.*, No. 2, p. 138, July 13th, 1912).
53. Wollstein and Meltzer (*Journ. Exper. Med.*, Vol. XVI, p. 126, 1912).
54. White (*Journ. Exper. Med.*, Vol. IV, No. 26, 1899).

The successful remedy for pneumonia will probably be some specific substance, which will not only protect, for at least a given time, against the pneumococcus infection, but will, either by active or passive immunization, minimize the untoward results of this disease. The discovery of such a specific will depend to a large extent upon the proper understanding of the entire course of the pneumococcus infection in the human. For this reason, the development of such therapy is dependent upon such elemental facts as the correct conception of the onset of the initial lung lesion, the factors determining the local or systemic invasion, the derivation and effects of the toxins, and the actual changes which take place in the blood or tissues at the time of the crisis determining the result.

The investigations made upon the immunity of this disease have been particularly interesting for the reason that they have been directed toward solving these special details of this infection. While comparatively few advances have been made in the practical treatment of this disease, tending to decrease its mortality, these studies have been extremely important for the reason that they have developed a clearer insight into the etiology and pathogenesis of the disease, and have helped to explain why the treatment in vogue at the present time (drug, vaccine or serum) has been unsuccessful. The vaccine or serum treatment of pneumonia has evolved through various states. In a general way, products having for their purpose the stimulation of the phagocytosis, or the increase of the bactericidal bodies of the blood—opsonins or lysins, etc.—has been the aim of these experiments. Leucocytic extracts, dead or attenuated pneumococci, the toxic products of pneumococcus, and extracts made from pneumonic lungs have been among the substances used to produce active immunity. The use of serums or anti-bodies developed in various ways, from injection of pneumococci, or their toxic products into animals, has been tried as passive agents of immunization. All these means of treatment have been more or less of a failure, or at least their therapeutic effects have been so inconstant as to make it difficult to estimate their actual value. This review, covering the recent work in serum and vaccine therapy, includes considerable of the literature elucidating the changes

which take place in man during this infection, which after all is really the groundwork for the elaboration of specific protective substances against pneumonia.

Lamar and Meltzer, by means of intratracheal insufflation of pure cultures of pneumococci, were able to produce pneumonia successively in forty-two dogs. There was a mortality of 16 per cent., and in the fatal cases the lesions closely resembled those occurring in man. Clinically, the non-fatal cases ran a shorter and milder course than the pneumonia occurring in man. The quantity of the culture seemed to bear a relationship to the outcome of the disease, as in the fatal cases larger quantities of pneumococci were used. The authors think that the successful results were due to the obliteration of the smaller bronchi by the injected culture, which permitted the organisms to display their pathogenic activities. Wollstein and Meltzer continued the work, using cultures of streptococci and the influenza bacillus, and produced a lesion resembling the bronchopneumonia of man and differed materially from the lesions produced by the pneumococcus. In the experiments the animals used were not selected, and hence the authors are led to believe that the proper invasion of the organism is the determining factor in the production of pneumonia. Furthermore, that in all probability different types of pneumonia are produced by specifically different bacteria. Whether or not the degree of virulence of the causative organisms bear a relationship to the type of pneumonia lesion produced, remains for future investigation.

Riesman and Kolmer, in their studies on experimental pneumonia, report that the pneumococcus is conceded to be the cause of pneumonia in man; but the experimentum crucis, the reproduction of the same disease in animals has not been made. They repeated the experiments of Lamar and Meltzer in eleven dogs, and have succeeded in producing pneumonia in seven, the four failures being probably due to using a catheter with a lateral instead of a terminal opening. They are, however, not convinced that the process induced in the animals can be called lobar pneumonia. It appeared to them that in their cases at least they had to deal with a confluent lobular bronchopneumonia. In an endeavor to obtain some light on the crisis of pneumonia, they injected rabbits subcutaneously with extract of normal lung in the stage of red hepatization and extract of lung in the stage of gray hepatization. Sixteen days later the animals were injected, this time intravenously, with the same material with which they had been sensitized. Those receiving the normal lung and red hepatized lung died, in every instance, of anaphylactic shock, in five or six minutes. Those receiving extract of gray lung became ill, but recovered without exception within ten minutes. Though they have speculated on this interesting phenomenon, they have at present no theory to offer.

Lyall, reporting upon blood cultures in pneumonia, says that there is a bacteriemia in many cases of pneumonia at some time during the course of the disease; this is now a well-established fact. Just how frequent this condition is, and whether it is actually present in every case, are questions which have not been satisfactorily answered. Various observers have published, from time to time, reports of cases with widely varying results. It is possible that these discrepancies may be traced to differences in the technique employed, to the particular time in the course of the disease at which the cultures were taken, or to seasonal or geographic conditions affecting the severity of the disease, dependent, perhaps, on the virulence of the organism.

Rosenow, in this country, and Prochaska, Silvestrini and Sertoli,

abroad, report the highest percentage of positive results. Rosenow, in a series of 145 cases, recovered an organism in 132, or 91 per cent. He used, principally, broth in flasks, in which the proportion of blood present represented a dilution of 1 in 50. Prochaska, in two series of 30 and 10 cases respectively, reports finding the organisms in 100 per cent. This author used both broth and agar, but obtained by far the more satisfactory results with the liquid medium, and points out the advantage of using a high dilution. Silvestrini and Sertoli obtained positive results in 15 out of 16 cases, almost all of which ended fatally.

On the other hand, there are numerous other observers whose percentage of positive cultures has been much lower. Bittman reports 6 positive out of 16 cases, Kuhnau one out of 9, White 3 out of 19. Shottmueller, in a series of 209 cases, found an organism in the circulating blood in only 23 per cent. He used, for the most part, cultures on solid media, making several plates representing varying dilutions of blood. Cole, out of 30 cases reported only 30 per cent. positive cultures, using both broth and milk. Strouse and Clough, in one of the most recent papers, obtained positive results in 56 per cent. of cases in a series of 25.

With reference to the recovery of the pneumococcus from the blood at the time of crisis, or lysis or after, results have been more uniform, the majority of authors failing to obtain growth at this time. Rosenow notes positive results after crisis in a few cases, usually when taken a few hours after the onset, although he was successful in recovering the organism as late as six days following crisis in a case of apparently delayed resolution. Wolf reports similar results, obtaining positive cultures after crisis or lysis in 6 out of 15 cases. In 3 of his cases there was delayed resolution, but in the other 3 there were no clinical complications. In Lyall's observation, only those cases are included, which at the time of culture or subsequently could be definitely diagnosed clinically as pneumonia. Cases were unilateral lobar pneumonia unless otherwise noted. He believes the value of blood cultures, as an aid to diagnosis, to be rather limited. As a rule, the clinical symptoms are sufficient to warrant a positive diagnosis. In 3 cases of the above series, the blood culture was of distinct advantage in the differential diagnosis: in 2 suspected cases of typhoid fever, and in one of suspected miliary tuberculosis. In this series, characterized by a low total death-rate, blood cultures were positive only in 40 per cent. The total number of cases was 42, of which 17, or 40.5 per cent., were positive, and 25, or 59.5 per cent., were negative. The total mortality was 11, or 26.19 per cent.; 5 patients who died were alcoholics. The positive cases show a mortality of 8, or 53.5 per cent., among which were four alcoholics. The negative cases showed a mortality of 3, or 8 per cent.; one patient who died was an alcoholic. On account of the incidence of alcoholism, it is difficult to draw any definite conclusions as to the relation between positive findings and prognosis. All cases at the time of, or after crisis or lysis, gave uniformly negative results.

Cole, in an important review on pneumococcus infection and immunity, says, in order to obtain a clear conception of the process of pneumonia, certain of the hypotheses advanced must be considered to be purely tentative and further work may show that different explanations are the correct ones. Biologically and clinically, the course of lobar pneumonia consists of these phases: first, the infection and onset of the symptoms, which events may or may not be simultaneous; secondly, the clinical disease or the intoxication itself; and, thirdly, the recovery or immunization,

whether this be susceptibility or resistance to the infection or to the intoxication.

While the pneumococci occasionally invade the normal lung in small numbers, there is a rapid multiplication of these organisms in the pneumonic lung, due to virulent pneumococci or lowered resistance of the host. Observations bearing on this question tend to prove that pneumococci of low virulence may be responsible for the onset of pneumonia. Cultures from the blood of pneumonia patients have low virulence for mice and rabbits. Ordinarily, exaltation of the virulence of organisms, when grown in the animal body, was the rule. The experiments of Meltzer and his associates also help to establish the fact that in dogs, at least, pneumonia may be induced by organisms of low virulence. That a decreased general resistance is responsible for the onset of pneumonia is not borne out by experimental evidence. His experiments support the view that the onset of pneumonia is due to a local condition in the lung, which permits pneumococci to grow there. Meltzer, Lamar and Wollstein produced, uniformly and constantly, lesions in the lungs of dogs which closely resembled those of acute lobar pneumonia, by means of direct injection, through a catheter, of quite large amounts of the culture fluid occluding the small bronchioles. These lesions have been produced with organisms having high virulence for rabbits and mice, but also with pneumococci having practically no virulence for these animals. This work permits a new conception of the onset of pneumonia. What may first occur in pneumonia is an exudate which may be non-specific in character, due to cold, trauma, etc., forming a small, infected cavity by the occlusions of a bronchiole. An observation of Gillespie's shows that the acid reaction induced by the growth of pneumococci depends on the presence of oxygen. When pneumococci are grown on the surface in contact with oxygen, probably little acid is produced. When, however, they are grown not in contact with air, acid is formed which induces to lower the local resistance of the lining of the air sacs. Clinical and pathological evidence is against the old view that the lesions of lobar pneumonia begin uniformly throughout the entire lobe.

The clinical features of pneumonia are those of an acute intoxication. The pulmonary changes are not essential, since septicemia may exist entirely apart from lung development. Severe symptoms may arise when the pulmonary lesions are comparatively slight. The author has been impressed with the fact that extension of the local process is associated with a continuation and increase of the symptoms. The most severe symptoms arise when a general, systemic infection supervenes. Theories to explain the intoxication are as follow: (1) The absorption of the products of digestion of the local exudate. Against this is the knowledge that the patient may be free of symptoms when this process is most active—namely, following the crisis. (2) The absorption of pneumococcus toxin. All attempts to discover a toxin in the culture fluids of pneumococci have been unsuccessful. To determine the difference of growth-products of the organisms within and outside the body, rabbits were infected with pneumococci. Just before death they were bled, the serum was passed through a Berkefeld filter and the filtrate was injected into a second series of rabbits. No signs of intoxication could be detected. Complete metabolic studies of the oxygen and carbon-dioxide content of the blood, carried on by Peabody, have not tended to support the view that the reaction of the body tissues is changed in pneumonia. A mild grade of acidosis occurs in all febrile conditions,

but the evidence seems to indicate that the symptoms in pneumonia represent more than an acidosis. The author attempted to isolate the toxic substances directly from the bodies of the bacteria. Pfeiffer showed that the killed bodies of certain bacteria, when injected in considerable amounts, are toxic. To these so-called endotoxic substances have been loosely ascribed the symptoms in a large number of infectious diseases. Pneumococci, when killed by heat, have very little toxicity. Friedberger demonstrated that if bacteria were first treated with immune serum, then centrifugalized, and the then so-called sensitized bacteria treated for a number of hours with serum containing complement at 37° C., a change, supposedly digestive, occurred and the resulting extract was toxic. The death resulting from the injection of this extract into guinea-pigs was like that seen in anaphylactic death, hence the name anaphylatoxin. He thinks that the substances are identical with those producing death in anaphylactic shock following the second injection of serum. Based on this experiment, Friedberger and others have developed a theory of intoxication in the various infectious diseases—namely, that the bacteria growing in the body stimulate the production of anti-bodies, these sensitize the bacteria, which are then acted on by the complement, resulting in the intoxicating substances.

Cole and others found these experiments correct with pneumococci, but differences of opinion exist as to their interpretation. Under certain circumstances similar results have been obtained by the action of normal serum on the bacteria without a previous treatment with immune serum. Dold and Rosenow have shown that if bacteria are merely allowed to stand in salt solution for from twenty-four to forty-eight hours, so as to undergo what has been termed autolysis, the resulting extract was toxic. Cole, repeated these experiments with pneumococci, injecting the extracts into a large number of guinea-pigs, and found that under certain circumstances such extracts are toxic, but that their action is inconstant and that it is extremely difficult to determine the exact conditions under which such extracts will be uniformly toxic. Instead of dying acutely, many of the animals die in from three to eight hours, and at autopsy marked hemorrhages are found in the cecum and stomach, and punctate focal hemorrhages are present in the lungs. Based on the experimental production of toxic autolytic extracts, Rosenow has formulated a theory of virulence. He states that virulent pneumococci autolyze readily and set free the toxic substance; non-virulent ones do not. Hence, virulence depends on the readiness with which pneumococci autolyze. Cole does not think that the matter is as simple as this. He states that while it is true in general that the more virulent pneumococci do autolyze more readily, yet virulence and ability to autolyze do not run parallel. Typical pneumococci, in his experience, always autolyze, whether they possess high virulence or not. Moreover, if a typical pneumococcus is allowed to grow on an artificial culture medium until it has lost its virulence, it still continues to autolyze.

Cole found that a solution of pneumococci in bile salts was highly toxic, killing guinea-pigs, when injected intravenously, within a few minutes. In these experiments the pneumococci were grown in bouillon, washed once in physiological salt solution, and made into an emulsion in as small an amount of salt solution as possible. The solubility of pneumococci in bile solutions was dependent on the concentration of the bile in the solution, and not on the relation of the number of pneumococci to the amount of bile present. After solution has occurred, the dilution

may be made to any degree desired. In the experiments, a 2 per cent. solution of sodium cholate was employed, 0.2 c.cm. of which was sufficient to dissolve the bacteria emulsion. Many times the amount of sodium cholate used for the single injection may be injected into a normal animal without producing symptoms.

These investigations would indicate that Pfeiffer's conception of an endotoxin is more likely to be correct than the present one that substances are digestive products. In any case, an active poison may now be readily and constantly produced from the bodies of pneumococci. It may or may not be that this is responsible for the symptoms in pneumonia. This substance is labile, being destroyed at 60° C. for one hour. It not only produces acute death in rabbits and guinea-pigs, but, by regulating the dose, death may be induced at different intervals. In the less acute death, hemorrhages into the peritoneum are common; frequently there is an acute nephritis, and the liver is pale.

It would seem that in pneumonia, the crisis affords an ideal opportunity to learn the nature of the process of immunity, but up to the present little evidence as to the nature of the crisis has been accumulated. The theory that the crisis indicates resolution has little to support it. It often occurs before any signs of resolution may be discovered; or resolution may occur long after all symptoms have disappeared. In case the toxic substances, previously discussed, do not really bear some close relation to that involved in the production of acute anaphylactic shock, it is conceivable that the crisis may be merely the onset of a refractory state analogous to that seen after acute shock.

The attempt to explain the recovery by an increase of the ordinary bactericidal substances in the blood has been unsuccessful. Attempts have been made, by combining leucocytes and serum, to show an increase of bactericidal or possibly phagocytic power of the blood-serum. These studies are not free from infection, as most of them have been made with organisms of low virulence; and, in the experiments in which plating methods were employed, the possibility of agglutination of the cocci has not been excluded. The experiments of Neufeld are of more importance as showing an increase in immune substances in the blood of patients following recovery from pneumonia. These results were obtained by testing the protective power of the serum for mice against a known lethal dose of pneumococci. He was able to show that while normal human serum had no such protective action, that obtained from patients following the crisis did have such an action. Other writers, such as Strauss, Deligmann and Klopstock, have not confirmed these results.

Dochex studied the blood of patients suffering from pneumonia relative to this point, and has obtained results which in general confirm those of Neufeld. The technique of his experiments was as follows: Specimens of blood were obtained at frequent intervals during the course of the disease, and also at the time of crisis and during recovery. These specimens were all kept on ice until the final specimen was obtained. Then, on the same day, the protective power of all these samples of serum was tested by mixing constant amounts with varying doses of pneumococci and injecting the mixtures into mice. A large number of mice were required, as many as one hundred for a single experiment. The organisms used in most cases were those obtained from the patient whose serum was being tested. If they were not virulent when isolated, they were rendered so by passage through animals. The serum from 14 cases was studied in this way. In one case the serum two days before crisis showed no

protective power. Three hours after the crisis, 0.2 c.cm. of the serum protected a mouse against 0.0001 c.cm. of the culture. In this case, 0.000001 c.cm. of the culture uniformly killed when given alone, or when mixed with the serum obtained before the crisis. The serum obtained two days after the crisis protected a mouse against 0.001 c.cm. of the culture. Serum obtained seven days after the crisis showed no protective power. This development of immune bodies in the blood-serum could not be demonstrated in all cases. Among the 14 cases studied, no other showed such a typical curve. In certain cases the appearance of immune bodies did not occur until several days after the crisis had past, and in other cases no appearance of immune bodies could be demonstrated. In the majority of cases, however, there occurred an increase in the immune bodies of the blood at or about the time for crisis, and this increase usually persisted for over a week or ten days. The irregular results obtained make it seem hardly possible that the crisis is directly dependent on this one factor alone. From clinical observation it would seem much more likely that the crisis represents a kind of neutralization of the intoxication rather than a destruction of the bacteria existing within the body. It is nevertheless true that the presence of bacteria in the blood apparently bears some relation to the outcome, for while in the patients that recover the bacteria are absent, or present in small numbers in the circulating blood, in the cases that go on to a fatal termination bacteria are usually present in large numbers. Moreover, while the virulence of the organisms concerned seems to play but a slight rôle in the onset of the disease, this factor is apparently an important one in the outcome. In practically all cases, in which large numbers of highly virulent organisms were present in the circulating blood, death resulted. On the other hand, in several cases, in which the organisms in the circulation were of low virulence, recovery ensued. It, therefore, seems probable that while the crisis may result from a neutralization of the intoxication, the possibility of this phenomenon is dependent upon the power of the body to overcome the vegetative functions of the bacteria. At the present time, the only definition of virulence as regards pneumococcus must be the power to vegetate within the body. In other words, the virulent organism has become adapted to this environment. This adaptation is apparently a property both easily acquired and easily lost by the pneumococcus. It is evident then, that the crisis in pneumonia is still an obscure phenomenon, and at the present time it cannot be stated positively whether it represents a destruction of the bacteria, a neutralization of the poison, a kind of anaphylactic shock, or a combination of all these phenomena.

Concerning specific therapy, especially treatment with immune serum, Cole adds that by the injection of living cultures intravenously, he has succeeded in producing active immunity in a horse, so that it would stand as much as 2,500 c.cm. of the virulent culture. When injected together with the culture, the pneumococcus serum, which obtained from this source was 0.2 c.cm., would protect a mouse against 1 c.cm. of a culture of which 0.000001 c.cm. kills—a protection against 1,000,000 lethal doses; but if the lethal dose of pneumococci was given first and the serum injected only a few hours later, it was difficult to protect, no matter how much serum was injected. Various explanations have been offered to explain this failure of the serum to act. Neufeld has endeavored to show that the failure was due to the fact that sufficient serum was not employed. He bases this view on certain experiments which he has performed, which show that as one injects mixtures of serum and bacteria into a series

of mice, gradually reducing both in the same proportion, a point was reached where the small amount of serum injected failed to be efficacious. He therefore thought that the reason why immune serums have failed to cure was that too small amounts, in proportion to the body weight, have been employed.

Dochex has performed experiments which indicate that there may be another explanation for the failure of immune serums to be curative. He has studied the results obtained by injecting mixtures of immune serums and culture into a series of mice, not only decreasing the amounts of serum and bacteria in the same proportion, but also gradually increasing the amount of bacteria injected; and he found that as the amount of bacteria was increased it was necessary to inject proportionately more and more of the serum in order to protect, and that finally a point was reached where no amount of serum, however great, was sufficient to save the animal. This indicated that, in addition to the presence of immune bodies contained in the serum administered, it was necessary for the body of the infected animal to play an active part, and that where the infection was very severe the body was unable to react to a sufficient degree.

In a severe pneumonia, the body contains an enormous number of organisms. In these cases Cole thought the reason the serum was not efficacious was not due to insufficient dosage, but that the body was not able to complete the action of the immune substance. If such serums are to be efficacious, some method of increasing this completing action of the body must be found. Curative effects may be obtained by combining active immunization, that is, vaccination, with the supplying of immune bodies—the administration of immune serum. His experiments with blood cultures showed that univalent serum, *i. e.*, one produced by the injection of a single strain, was efficacious in protecting animals against about only 40 per cent. of the cultures obtained from the circulating blood of patients. At least 60 per cent. of cases are due, therefore, to organisms other than those of the type strain. Whether a polyvalent serum would be able to overcome this factor is not certain.

So far, the value of the practical application of specific forms of treatment has not been established. Observations on the specific treatment of experimental pneumococcus infections by means of mixtures of soap, serum and boracic acid have been made by Lamar. This work is based on sound experimental evidence, but so far has not received practical application. Leucocytic extracts, vaccines and watery extracts of bacteria have been employed as therapeutic measures. Their exact value still remains to be determined. Moreover, Morgenroth has prepared a derivative of quinine—ethyl-hydrocuprein-hydrochlorate—which is said to have curative value in experimental infections and has already received some clinical study. Unfortunately several cases of amblyopia have resulted from its use.

Meltzer in discussing Cole's paper said that medicine was still dominated by the anatomical view of disease. The pathological changes found after death from some disease were generally identified with the disease itself. These anatomical changes might be only a consequence of the disease, or, what is more important, they might be the result of the body's attempt to defend itself against disease, or an attempt to repair the injuries caused by the disease. The pathological phenomena of pneumonia may be looked upon from another point of view, which he advocates on the basis of some experimental observations. The essential features of in-

flammation were hyperemia and exudation. The hyperemia assists in the exudation of serum and cells. It was now generally assumed that the mission of the exudate is to defend the body against the invading infection. The leucocytes destroy the bacteria which are prepared for this end by the serum; the leucocyte and serum enzymes antagonize in some way the bacterial toxins, and the leucocytes digest the debris of the coagulated serum, the fibrin and the broken-down leucocytes. In short, inflammation is a defense against disease and not the disease itself. It is plausible to assume the anatomical changes in pneumonia present simply defensive reactions of the lung tissue against the invading pathogenic organisms. In many instances, however, the defenses fail and large numbers of the virulent bacteria succeed in escaping from the exudate and entering into the circulation at a period when the blood has lost a great deal of its defensive ammunition. This leads often to a fatal issue, which explains why Cole and others could easily find bacteria in the blood only in fatal cases of pneumonia. In experiments made by him and Lamar with intrabronchial insufflation of cultures of a very virulent pneumococcus, typical pneumonic lesions were produced in every instance. The experiments gave a mortality and no bacteriemia. Apparently the anatomical changes in pneumonia are not the cause of death. Neither do they present the essential features of the disease. On the contrary, they are manifestations of the body's fight against the disease.

Vaughan stated that under ordinary conditions the body was protected against infection by the proteolytic ferments. These dissolve the bacteria with which it became inoculated. The pneumococcus is constantly prevalent in the lungs. When, for any reason, the tissues fail to furnish in an active form the ferment that splits up the pneumococcus, it grows uninterruptedly and pneumonia results. Of the protective proteolytic ferments with which the body was furnished, there were two kinds. One was non-specific, and there are many reasons for believing that this was the one that ordinarily protects against pneumonia. Increased resistance to pneumonia was easily induced experimentally in the lower animals.

Robinson said that the conditions of infection in the alveoli precedes that in the bronchioles very often for days. He questions Cole's statement that the pneumonia began in the bronchioles, and was found only secondarily in the alveoli. He had found evidence of the presence of pneumococcus in the very clear serous exudate in the alveoli. Afterwards, these organisms were apt to be found multiplied, but he thought that something was at work, previous to the multiplication of the germs causing pneumonia, that allowed the infection to extend into the alveoli, *i. e.*, exudate from there and spread the infection before the invasion of the pneumococci from the blood current occurred. Almost every one of the cocci that produces inflammatory conditions, except the gonococcus, could produce pneumonia. The pneumococci have produced everything that the streptococci and other organisms produce. Intoxications from the pneumococci resulting in the picture seen in blood invasion, frequently occur without any lung involvement. Eliminate dysentery, and evidently a mixed infection is present in many cases. It was impossible to separate these from pneumococcus pneumonia by means of the general symptoms. The only method of differentiation was by a study of the bacteria themselves.

Rosenow in discussing Cole's work, relative to the "endotoxin theory" of Pfeiffer, stated that experiments, cited as proof that certain bacteria contain endotoxin, show that his animals died in from four to twelve

and twenty-four hours after the injection was made. In repeating these experiments he found that when he injected unautolyzed suspensions or extracts of pneumococci into guinea-pigs, they died in from eight to twenty-four hours, depending upon the size of the dose. At a certain period after the suspension or extracts have been kept at 37° C., the toxicity was greatly increased, and the guinea-pigs died in two or three minutes from bronchial spasms, whereas later they showed no immediate or subsequent symptoms. These changes have been proved to be associated with proteolysis. Suspensions of mechanically broken up pneumococci (made by grinding in a mortar, autolysis being prevented by cold) kill in from six to twenty-four hours, but the animals show no immediate symptoms. When these suspensions are placed at 37° C., the appearance and disappearance of the toxic substance follows the same rule as in the case of pneumococci which are not previously broken up. From these experiments it would seem that, in the case of pneumococci at least, the toxic material is largely made during their disintegration (proteolysis), whether *in vivo* or *in vitro*. By testing the effects of extracts, in sodium chloride solution, of consolidated lungs and other pneumococcus exudates, he found that similar substances are found *in vivo*. When the freshly washed material from these exudates is suspended in sodium chloride solution and placed at 37° C., the toxic substances appear in solution and then disappear just as do those in suspensions of pneumococci. Since the toxicity disappears after a time in the suspensions of the pneumococci to which bile salts are added, it was apparent that the changes which take place in each case must be of a similar nature. In the case of autolysis in extracts of pneumococci, and in the action of normal and immune serum on pneumococcus extracts, he proved that the appearance and disappearance of the toxic substance is associated with proteolysis. While protein-splitting here and *in vivo* may not be the whole factor, he feels that the evidence is strong that in pneumonia, for instance, proteolysis plays an important rôle in the destruction of toxic substances which may be specific to a certain degree and non-specific to another degree. Indeed, Dick has shown that at the time of crisis, or soon after, the specific proteolytic power against pneumococcus protein of the serum is definitely increased.

Hirschfelder referred to the work of J. O. Hirschfelder, who immunized rabbits by means of a solution of pneumococci digested with pancreatin, in an alkaline solution, for about fifteen minutes. He thus was able completely to dissolve the pneumococci. He then acidulated slightly with hydrochloric acid and filtered with a Pasteur filter. The rabbits injected in this way with 35 to 40 c.cm. of this solution acquired immunity for a period of from six to twenty days. In contrast to the bile solution that Rosenow and Cole have reported, this vaccine was able to retain its power to immunize for at least three months after its preparation, at room temperature, when the laboratory temperature varied from 45 to 65° F. The serum of a dog immunized with this dissolved pneumococcus was capable of protecting a rabbit against an ordinarily fatal dose. Some experiments performed by Major and Morse were undertaken with a view to determining whether the crisis on pneumonia is an anaphylactic phenomenon, as Anderson had suggested. A cutaneous reaction was produced by the use of a very concentrated solution of pneumococci, which they were allowed to autolyze. A small number of cases were experimented on; the tests that were made before the crisis all gave negative reactions. In the tests made at the time of and after the crisis, a peculiar

popular reaction, which somewhat resembled the luetin reaction of Noguchi, but which consisted in the development of a much harder and more horny papule, took place. There was, in some cases, a certain zone of erythema in the positive cases; but it did not bear a striking resemblance to the von Pirquet tuberculin reaction. On the other hand, in the fatal cases, no reaction occurred.

Warden reports that J. O. Hirschfelder's work parallels observations made by him. His experiments have been studies of a group of organisms which have been the common characters of autolysis and enzyme production—namely, the pneumococcus, the gonococcus, and the meningococcus, and, to a lesser degree, the staphylococcus. Of these organisms, the pneumococcus lends itself to animal experimentation, and the work of Rosenow and others has done much to clear up the nature of the autolytic processes, and the chemical and biological characters of the autolysates. The enzymes of this group of organisms, of which the pneumococcus may be regarded as the type, are proteolytic and appear to operate like enzymes of the tryptic variety, *i. e.*, best in slightly alkaline mediums. It has been shown by Dick that at the time of crisis in pneumonia the blood shows the presence of a proteolytic enzymes, especially in those cases which go on to recovery, and the inference is drawn that this enzyme is the product of pneumococcus activity. His observation has led him to believe that this contention is true. Using the highly susceptible rabbit, he has been studying the effects of immunity conferred by inoculations of infected animals with pancreatin solution alone, with pancreatin extracts of pneumococci, and with like extracts of pneumococci and staphylococci. So far as these experiments have gone the indications point to the following conclusions: First, that pancreatin solutions alone are capable of producing immunity in infected and non-infected rabbits; secondly, that filtered pancreatic extracts of pneumococci, and of pneumococci and staphylococci also, show immunizing and curative powers; thirdly, that all three of these agents are capable of modifying favorably the course of pneumococcus infections in man.

J. O. Hirschfelder says that the extensive employment of vaccines made from dead micro-organisms has been followed by variable results; in some cases the results have been excellent, in others absolutely negative. It seemed probable that these discrepancies might be due to the fact that in the one case an efficient quantity of the bacterial endotoxin had entered into the circulation, whereas, when no beneficial results ensued, it might be that a satisfactory extract of the micro-organisms had not occurred. It therefore seemed logical to search for a means of dissolving the active principle of the bacteria with as little injury as possible. His solution was made by acting on the living micro-organism with an alkaline pancreatin solution at 37° C. for a definite time, stopping the action by slight acidulation and filtering through a Pasteur filter. Studies with the pneumococcus showed that the virulence of the micro-organism could be readily maintained by growing it in a 2 per cent. glucose, 4 per cent. glycerine veal bouillon, faintly alkaline to litmus, to which calcium carbonate had been added, according to the method of Hiss, and transplanting the culture daily. It was of interest to note that unless the culture with the calcium carbonate was shaken frequently it will become acid, as diffusion through the liquid was not sufficiently rapid to preserve the neutral reaction. In order that there should be no doubt of the results, larger doses of the pneumococci than were necessary to kill the rabbit were employed; but the variability of the time necessary to kill the con-

trol was probably due to the varying acidity that developed in the culture medium. This occurred before it was discovered that the mere presence of the calcium carbonate did not preserve the neutrality of the liquid.

One rabbit was vaccinated with 5 c.cm. and another with 40 c.cm. of a solution prepared from a culture of the pneumococcus that had not grown very vigorously. Later they and a control were each injected with 0.05 c.cm. of a virulent pneumococcus culture. Two days later the control was dead of pneumonic septicemia with the micro-organisms in the blood, whereas the vaccinated animals are still living. In later experiments in which two injections of the extract were given—a small one, followed a week later by a larger dose—active immunity to the pneumococcus was more regularly produced in the rabbit.

They found that the vaccine did retain its qualities without any preservative at ordinary temperature (45 to 65° F.) for at least somewhat over three months. A serum was produced by this vaccine, which caused passive immunity in dogs and rabbits to virulent pneumococcal infection.

Ten patients with pneumonia, who were treated with an extract prepared from an emulsion of the same washed living pneumococci, all recovered. In a majority of the cases crisis set in within twenty-four hours after the first dose. A striking fact observed was a rapid fall of the number of leucocytes within twelve hours and preceding reduction of temperature. The author concludes that the number of cases was far too small to warrant an estimate of the value of the treatment, but certainly proved its harmlessness.

The toxic substance obtained from pneumococci, Rosenow found to be soluble in ether. It is formed chiefly during retrogressive changes in pneumococci. Heating the clear toxic autolysate to 60° C. for twenty minutes destroys the toxicity, while toxic pneumococcus suspensions remain toxic even after boiling. Hydrochloric acid in weak solution destroys the toxicity of pneumococcus autolysates. The toxic substance is absorbed by blood charcoal from which it can again be obtained by shaking with ether. Autolyzed virulent pneumococci and non-virulent pneumococci diminish the toxicity slightly, while unautolyzed virulent pneumococci increase it. The toxic substance is probably a base which contains amino groups of nitrogen. Indications have been obtained showing that during pneumococcus infections toxic substances are produced which do not call forth any immunizing response.

The action of the toxic substances obtainable from pneumococci and pneumococcus exudates on the blood-pressure and respiration in normal dogs is said, by Rosenow and Arkin, to be identical and strikingly like that which is observed in immediate anaphylaxis in dogs. Pneumococcus anaphylaxis in dogs does not essentially differ from protein anaphylaxis in general. The lesions are also similar. The hemorrhages, the effect on the respiration, the extreme grade of cyanosis, especially in the fatal cases, the delayed coagulation of the blood and the presence of carbon dioxide in the stomach indicate that one of the chief effects of the toxic substances is an interference with the normal oxidative processes. The toxic substances concerned are probably of the same general nature because the lesions and the effect on the circulation and respiration are so similar, and it makes no essential difference whether they are formed *in vitro*, in the consolidated lung in man, at once in sensitized dogs, or at a later period in normal dogs.

Wadsworth states that virulent pneumococci when studied in the test-tube, and as compared with many other bacterial species, are exceptionally

insusceptible to both bacteriolysis and phagocytosis. Virulent pneumococci in the body tissues are also insusceptible to the action of most of the immune serums with which attempts have been made to cure the infection both in man and animals. Yet recovery takes place spontaneously both in animals and man. In order to determine why it is that the significance of pneumococcus immunity is so strikingly manifest in the recovery of man from lobar pneumonia, and the action of the blood-serums of immunized animals on the pneumococcus so singularly inadequate in the test-tube and in the treatment of infection, the following series of experimental studies were undertaken. These comprise studies on the action of dead pneumococcus cultures on animal tissues, on the action of immune serums on the pneumococcus, on the action of hyperthermy on pneumococcus infection, and, finally, studies on the action of immune serums on pneumococcus infection, and of the mechanism of recovery from pneumococcus infection. In general, it was found that the dead pneumococcus cultures failed to incite disease processes comparable with those seen in active infection, but that an adaptive tissue reaction was incited which rendered the animal immune and gave rise to the well-known agglutinative, precipitative, lytic and opsonic activities in the blood-serum.

From the study of the action of immune sera on the pneumococcus under ordinary conditions, it was found that the insusceptibility of the pneumococcus to bacteriolysis and phagocytosis was due to the exceptional virulence, adaptation and growth of this organism. But in the tissues both lysis and phagocytosis took place, and the activity of the pneumococcus growth was found to approximate very closely temperatures often attained by the pneumonia patient, and the bactericidal action of immune serums at these temperatures was greatly exalted. These significant results were further supported by those obtained in the study of the effect of hyperthermy on pneumococcus infection, by which it was shown that, although the animal organism may be injured, the activity of the infectious agents may be inhibited markedly during the hyperthermy under certain conditions, the most important of which is the presence of an active protective mechanism in the tissues. Finally, it was found from the results of the study of the action of immune serums on pneumococcus infection that the curative action of antibacterial and antitoxic serums obtained by the immunization of animals with dead virulent pneumococcus cells and with culture filtrates free from bacterial cells is slight, whereas serums obtained from animals immunized with virulent living cultures possessed marked curative action inducing crisis. In the mechanism of such recovery the neutralization of the products of the pneumococcus, whether toxins or endotoxins, was found to be the dominant determining factor to which the destruction of the bacteria, whether extracellular by bacteriolysis or intracellular by phagocytosis, was incident.

Freeman briefly reviews the results of vaccine treatment of pneumonia as follows. Autogenous vaccine therapy, according to Stoner, who has collected 155 cases of pneumonia, gave a mortality of 12.9 per cent. Howland and Hoobler report 50 cases, mostly in young children with bronchopneumonia, and some older ones with lobar pneumonia, treated with stock vaccines with no favorable results.

The results obtained from the so-called Rømer's serum, a pneumococcus serum, have been in general very favorable. Kriske reports 10 cases in children from nine months to ten years of age, in which he noted a distinct improvement after the administration of the serum, and all the chil-

dren recovered. May reports good results in 20 cases with increased leucocytosis. Monti used it in 12 cases with decided benefit, while Knauth, Linderstern, Tunher and Crux used it with favorable results. Brunning treated six patients with falling temperature, slowing of the pulse, and general improvement after the administration of the serum. All these observers used a dosage of about 10 c.cm. for children and 20 c.cm. for adults.

Morse reported 8 cases in which the patients were treated with 5 c.cm. of pneumococcus serum every four hours, or about 30 c.cm. daily, and concluded that the treatment "had no effect on the duration of the disease, the course of the temperature, the rate of the pulse and respiration, or the progress of the local condition. Complications occurred at least as frequently as is usual. Death occurred in an unusually large percentage. The serum, while it apparently did no good, certainly did no harm."

Freeman's series, treated with the serum, was in patients showing a fairly high temperature with good signs in the chest. One of the injected patients had a severe pneumonia complicating measles, another with measles-pneumonia being used as a control. This patient showed no good effects from the serum, and finally died of general septic conditions and endocarditis. Three patients injected are not included in this paper: two were moribund when injected and were injected simply to see whether the serum might help them. One of these was rigid and comatose, and did not cry out when the large needle was thrust into the abdominal wall, and died within four hours after the injection. In the other similarly hopeless case the patient died within twenty-four hours after injection. He also injected an adult who recovered.

The first seven of the patients were injected with a simple pneumococcus serum—a large dose, 100 c.cm., being injected and in some cases repeated. The injection was done by means of a burette made for salvarsan injection, a rubber tube with a glass section near the needle, and a very large needle, this being necessary as the blood-serum will not flow freely through a small needle. The injections were all made into the anterior abdominal wall; and it was found that by keeping the end of the needle in the fascia below the skin and gradually advancing this rather long needle, 100 c.cm. could be readily delivered with one penetration of the skin. Pressure was made in addition to that of gravity by the use of a rubber bulb attached to the burette.

The first seven patients received 100 c.cm. of pneumococcus serum, while the last eight received 50 c.cm. each of pneumococcus and streptococcus serum.

In none of the cases was there any evidence of irritation at the point of injection. The serum was rapidly absorbed and there was no inflammatory disturbance. In all the cases, on the other hand, the injections were followed by urticaria, sometimes appearing on the following day, often ten days later, but without fever or general disturbance. In one case in addition to the urticaria an ankle-joint was swollen, hot and painful, but this subsided in twenty-four hours and was accompanied by little rise in temperature.

The children injected varied in age from two months to three years and three months, the average age being twenty months, while the controls ranged in age from three and a half months to three and a half years, with an average age of eleven months.

The effect of the injections on mortality was as follows: Of the

fifteen injected patients, nine recovered and six died, giving a mortality of 40 per cent.; of the fifteen controls, eight recovered and seven died, giving a mortality of 47 per cent. Among the six patients injected with pneumococcus serum alone there were four recoveries and two deaths, while the controls showed five recoveries and one death. Of the nine patients injected with the pneumococcus and streptococcus serum, five recovered and four died, while of the controls of these there were three recoveries and six deaths. Repeated injections in patients who had shown no reaction from the first injection were equally unsuccessful.

In conclusion, he says that the serum injections, while apparently affecting favorably the course of the disease in some cases, appeared to have no result in others; that in most cases there appeared to be a better reaction on the part of the child after injection than before. It was usually followed by some reduction in leucocytosis, and the percentage of the polynuclear leucocytes was also diminished. In these favorably influenced cases there was little spreading of the disease after injection, and in some a fairly rapid resolution. The injected patients who lived had a much shorter average course than the controls, and the mortality of the injected cases was slightly less than that of the controls. Pneumococcus serum presents a safe method of attempting to influence the course of pneumonia in children; the addition of antistreptococcus serum seems to offer no advantage over the use of the pneumococcus serum alone.

Charteris used the vaccine in a series of 19 cases of acute pneumonia. The cases were not specially selected, and were, as far as possible, treated with vaccine alone, though in all serious cases the usual remedies were used, such as the administration of strophanthus and stimulants. The only selection made in regard to the cases was to exclude from the vaccine series, those cases which, on admission, seemed to be on the point of having the crisis. In this way an additional series of 10 cases was observed during the same period in which the vaccine treatment was being used. These 10 cases have, therefore, the value of control experiments. The vaccine used in this series of cases was prepared from organisms isolated from the sputum of 5 typical cases of pneumonia. The vaccine was tried at all stages of the disease and in varying doses. The effect of the vaccine treatment was certainly not miraculous. Four patients died of the disease, while a fifth, after coming through the acute stage, succumbed to exhaustion on the sixth day after the crisis. This mortality is not very satisfactory, but it compares not unfavorably with that of the series of 10 cases, with two deaths, which were treated in the same wards without vaccine during the same period. Of the fatal cases in the vaccine series, the only instance in which the vaccine seemed to do harm was in a case in which death from hyperpyrexia occurred within eighteen hours of the administration of the vaccine. In another case, the first two injections of the stock vaccine had no apparent effect, but the third and fourth injections, which contained an autogenous strain, were followed by such marked improvement that the patient seemed to be on the high road to recovery. A fifth injection was followed by an alarming increase in the severity of the symptoms; first empyema, and, later, meningitis developed. The early administration of vaccine did not abort the disease, nor prevent complications. Complications were relatively frequent in the vaccine series, viz., one instance of meningitis, two of empyema and one of hyperpyrexia.

Robertson and Illman report that in their employment of this treat-

ment, in some instances strikingly prompt and beneficent results follow the use of bacterins; but since these results are not uniform, the authors believe that something is lacking in the employment of dead cultures as at present practised. They urge that care should be taken in their preparation, as it is probable that their biological properties may be destroyed by the degree of heat used to kill them. A temperature not over 56° C. would be advisable, or 5 per cent. phenol in the proportion of $\frac{1}{2}$ per cent. may be employed. Nephritis, when preexisting, is of grave prognostic import. Bacterins apparently do not exercise any influence, pro or con, on the renal condition. In the author's series, the mortality was notably less in the cases given bacterins.

ALBUMIN MILK (*EIWEISSMILCH*) IN THE NUTRITIONAL DISTURBANCES OF INFANCY.

A REVIEW OF RECENT LITERATURE.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Grulee: Infant Feeding. W. B. Saunders Co. 1912.
2. Rachford: Diseases of Children. D. Appleton and Co. 1912.
3. Brady: Infant Feeding as Taught by the German School. (*Interstate Medical Journ.*, July, 1912.)
4. Abt: Fallacies in the Treatment of Gastro-Intestinal Diseases. (*Interstate Medical Journ.*, July, 1912.)
5. Cassel: Experiences with Albumin Milk. (*Archiv fuer Kinderheilk.*, Vol. 58, p. 241, 1912.)
6. Neff: A Series of Infants Fed on Albumin Milk. (*Journ. Amer. Med. Assoc.*, December 21st, 1912.)
7. Holt and Levene: The Influence of High Proteid Feeding on the General Metabolism of Infants. (*Amer. Journ. Dis. Children*, November, 1912.)
8. Friedlander and Greenebaum: Influence of Food Upon the Intestinal Flora of Infants. (*Arch. Pediatrics*, September, 1912.)
9. Finkelstein: Concerning *Eiweissmilch*. (*Amer. Journ. Dis. Children*, May, 1912.)
10. Hoobler: Mineral Salt Metabolism. (Edit. *Arch. Pediatrics*, March, 1912.)
11. Salge: Concerning the Pathology of Starch Nutritional Disturbance. (*Jahrbuch fuer Kinderheilk.*, August, 1912.)
12. Ladd: Studies on the Nutrition of Infants. (*Arch. Pediatrics*, May, 1912.)
13. Morse: Maltose in Infant Feeding. (*Amer. Journ. Med. Sciences*, November, 1912.)
14. Sainmont: Effects of Different Sugars on Dogs. (*Monatsschr. fuer Kinderheilk.*, Vol. X, No. 11, 1912.)
15. Brady: Polycarbohydrates on the Diets of Young Children. (*Amer. Journ. Dis. Children*, August, 1912.)

Observations on the value of albumin milk, as originally proposed by Finkelstein and Meyer in the treatment of certain nutritional disturbances of infants, continue to multiply, and it seems worth while to supplement a critical review of the subject appearing in the *JOURNAL* in May, 1912 (Dr. F. C. Hempelmann).

Those interested in the views of the Finkelstein school on nutritional disorders of infancy, will find an excellent exposition of the subject in Grulee's textbook on "Infant Feeding" (pp. 157-219). A short but clear résumé will also be found in Rachford's textbook (p. 184).

For years pediatricists, especially of the American school, have taught that the difficulties in artificial feeding of infants were caused by the

proteids of cow's milk. The work of the German school has completely overthrown this doctrine. As Brady puts it, they (the Germans) have shown conclusively "that the proteids of cow's milk are not toxic and are not indigestible. No nutritional disorder is recognized which is traceable to the proteids." While the proteid of cow's milk is considered harmless, the same cannot be said with regard to the fats, sugars and salts. It was because of the definite disturbances following too much fat (milk nutritional disturbance) on the one hand, and, on the other, because of so-called alimentary intoxication resulting from too much lactose, that Finkelstein and Meyer originally suggested the use of albumin milk. As is well known, this consists of the curd from a litre of whole milk, added to one-half litre of fat-free buttermilk, plus water to make one litre. Maltose is added in various amounts, according to the individual case.

As experience has grown with this method of feeding, it has become increasingly apparent that much care is necessary in the preparation of the food, if good results are to be obtained. As Abt has put it, this food "has frequently given brilliant results in the hands of those who understood how to prepare it and the details of its administration."

Cassel reports the results obtained with this food in appropriate cases. His clinical material was drawn from his polyclinic in one of the Berlin foundling asylums. His detailed report is illustrated with weight charts and tables of feeding details. He believes that no other method of treatment of the nutritional disorders of infancy can be compared with the albumin-milk treatment. Furthermore, it would seem that the albumin-milk feeding need not be unduly prolonged in many instances. This is an advantage, as the food is, comparatively speaking, expensive, which is an important economic factor in institutional practice.

Neff reports a series of cases fed on what he calls high percentage albumin milk. The technique of preparation was that employed by Finkelstein, except that Neff used the fat and casein from one quart of full milk and casein and salts from one quart of buttermilk. No water was added. This food averaged 18.3 calories per ounce, 588 calories to the quart. All the infants to whom the food was given were under six months of age. All had been in an institution from birth and had been continuously observed. Many of them had not gained on breast milk; none had gained on sweet cow's milk. Of the 16 infants, 9 showed marked gain in weight, 2 showed loss and 2 only slight gain. In all the cases the good effect upon the dyspeptic stools was marked. It is noteworthy that the high proteid content (3.3 per cent.) in contrast to the 3 per cent. of the Finkelstein albumin milk caused no disturbances.

In the discussion which followed the reading of this paper, Hess called attention to the fact that many of the reported poor results from the Finkelstein mixture had undoubtedly been due to faulty method of preparation. He insists that the Finkelstein technique must be followed in every detail, and that if gain in weight does not follow, when the food is being properly digested, the amount of malt-sugar must be steadily increased.

Schwarz suggested that one important part of Finkelstein's work was that he had called attention to the difference between normal and abnormal children as regards the assimilation of sugars. For the abnormal child lactose is evidently not as easily borne as maltose. This view was, however, not accepted by many others present. Lowenburg, for example, insisted that his results with top-milk mixtures and cane-sugar were very good, saying that it was hard to see why milk-sugar should

be charged with so many of the digestive disturbances of infants, seeing, that it is a natural ingredient of human milk; in which it is present in large amount.

Holt and his co-workers, Levene, Wollstein and Courtney have recently published the results of their studies on infant metabolism. The problem was considered from the clinical, bacteriological and metabolic points of view by the different observers. For details as to the second and third groups, the original article must be consulted. The food given the children was so arranged that it would contain a maximum of one of the three principal food constituents, and a minimum of the other two. However, high fever, restlessness and general discomfort developed when the children were put upon a synthetic food of very high protein proportion. These symptoms ceased when the food was changed. It is to be noted, however, that the protein percentage of this synthetic food (6 per cent.) was just double that of Finkelstein's albumin milk. The general conclusions of the authors with reference to the high protein intake was as follows:—

Fever occurred only when the protein percentage reached 6 per cent. with a minimal quantity of milk daily—150 to 175 c.cm.

After the first rise of temperature, the fever persisted so long as the diet was continued, but in every instance disappeared as soon as the food was changed. The observers feel sure that one may use considerably higher percentages of protein than those of Finkelstein's albumin milk. This may be of much practical importance in conditions in which there is marked intolerance both of fats and carbohydrates. Such high proteins as 4.5 per cent. or over should be used for limited periods only, and never given at all except with a suitable proportion of whey. The physiological importance of whey is especially emphasized. Finkelstein and Meyer, while laying stress on the dangers of whey, especially from its sugar content, have also appreciated the dangers to nutrition which may follow reduction of the salts.

Holt and his co-workers also found that changes in the food influenced the chemistry of the excreta more than they did the bacteriology. While the chemical changes resulting from food variations were great, the bacteriological ones were not. Such changes would thus have a limited field of application only for therapeutic purposes, though the change is definite when the food variations can be made sufficiently great.

With reference to this latter point, Friedlander and Greenebaum reached the same conclusion as the result of careful study of a limited number of cases, using albumin milk and simple modified milk at intervals, and studying the intestinal flora in each instance.

Answering a criticism of Morse as to his results, Finkelstein calls attention to the fact that a diminution of the whey, carrying with it, of course, a diminution of the salts, may lead to disastrous results. A child needs not only sufficient calories of protein fat and carbohydrate, but also a definite minimum of the salts contained in the whey. Children getting too little whey develop salt hunger, the first symptom of which in strong children is cessation of gain in weight. In weak children with nutritional disturbance, there is a rapid fall in weight, even threatening death, though the caloric value of the food be normal.

Hoobler has published the results of his studies of mineral salt metabolism. He is convinced that the mineral salts play a very definite and important rôle in the nutrition of the infant. He calls attention specifically to the fact that there is a constant loss of weight in certain infants who

to all intents and purposes are fed upon a perfectly logical formula. The trouble may not be with the fat proteid or carbohydrate, but may be entirely a matter of salts in their proper proportion.

In a discussion of the pathology of so-called starch nutritional disturbances in infants, Salge shows that in a polycarbohydrate diet the infant's organism is in particular danger of salt hunger. If the child is unable, on such a diet, to get or retain the proper amount of salts, the loss of salts may become severe and even demonstrable in the composition of the blood. This disturbance in salt metabolism offers a definite explanation of the lowered resistance of such children against infection. Discussing the value of *eiweissmilch* as a food, Ladd says that there can be no question that it is a much more digestible mixture than an ordinary modification of milk, which has the same composition. He says further that in the albumin milk there is no curd formation, and therefore no entangling of the fat in its meshes. Both fats and casein are therefore much more free to be acted upon by the gastric and intestinal juices than in an ordinary cream mixture of the same composition.

The very low percentage of milk-sugar in albumin milk must also be a factor in increasing the digestibility of the casein, as it is a fact of common experience that, when any one element of the food is greatly reduced, the remaining elements are more easily digested. He considers the inconvenience of preparation a serious objection to the food, and though admitting its usefulness in the acute stage of diarrhea, he questions whether it is a suitable food to use in the cases of long continued indigestion with malnutrition.

Morse's criticism of albumin milk, as voiced in his most recent publication, is that according to the teaching of the Finkelstein school practically all cases of infantile diarrhea are to be treated on the same basis. He reports that he has had excellent results from the food in some cases, but points out that "precisely similar stools may be seen in other conditions in which the trouble is due primarily to bacteria and in which this method of treatment may do material harm. It is to be hoped that, with increasing knowledge of the bacteriology of the intestinal tract in infancy, some simple methods will be evolved which will make it possible readily to differentiate between the diarrheas due primarily to chemical changes in the intestinal contents and the disturbances of the digestive functions dependent on them, and those due primarily to bacteria. At present, it is extremely difficult to distinguish between them and correspondingly hard to know how to treat them."

His general conclusions are that lactose is for many reasons preferable to maltose for the feeding of normal infants. There is a type of intestinal indigestion, due to the fermentation of sugar in the treatment of the convalescent stage, in which maltose is better borne than lactose. Maltose is contraindicated in the treatment of diarrheas due to the gas bacillus and similar organisms, and is less useful than lactose in the treatment of those caused by the dysentery bacillus. In this connection some recent studies of the toxic effects of various kinds of sugar on young dogs, as carried out by Sainmont, are of interest. Sainmont found that the administration of quantities of sugar (20 gm. per kilogram of dog weight) of different kinds, had very different results. Cane- and grape-sugar showed constant, definite toxic effects. Milk-sugar, which is a disaccharide, composed of dextrose and galactose, was very much less toxic, while pure galactose was not toxic at all. All the evidence pointed to definite meta-

bolic disturbances after exhibition of cane-sugar and grape-sugar, which were the direct cause of death.

The single case of death from milk-sugar was in all probability to be explained solely on the basis of an exhaustion from the actual diarrhea itself.

Brady reports excellent results in a series of asylum children fed upon skimmed milk with high carbohydrate additions. The total carbohydrate percentage of the mixture equalled 7.91 per cent. Used as a routine ward formula for young infants, Brady also found it of value in cases of diarrhea after the acute stage had been controlled by *eiweissmilch*. The author believes that his food formula is of special value for asylum infants; but, in order that the diet be successful, the protein must be liberal in amount and special attention must be paid to the fat, which should only be raised with the increase of weight of the baby.

DIAGNOSTIC AND THERAPEUTIC NOTES.

SUCTION DRAINAGE IN EMPYEMA.—Saakianz (*Wien. klin. Rundsch.*, Nos. 25-28, 1912). The writer advocates the use of suction drainage in empyema. A rubber disc, 10 cm. in diameter, has a hole punched in its centre in which the drainage tube fits. The skin about the wound is covered with dermatol ointment, and the rubber disc is placed over it so that its opening lies over the wound. The drainage-tube, passes through the hole in the disc which fits it tightly and through the wound into the pleural cavity. The disc is held tightly against the skin by means of adhesive straps and the dressings so that an air-tight covering results. The distal end of the drainage-tube is attached to a flask from which the air has been partly exhausted by means of an air-pump. The dressing is changed every two or three days. It is claimed that by this method the physiological condition of the pleura is restored, a steady negative pressure equal to 50 or 100 mm. of mercury being maintained, and at the same time thorough drainage is secured. Moreover, the hyperemia induced by the negative pressure converts the purulent secretion into a serous discharge. The author recommends that this suction drainage should be used after simple resection of a rib, and also before the radical plastic operation of Schede for chronic empyema with fistula. In this operation a large skin flap is dissected up, and a section of the chest wall removed by sawing through the ribs. The laceration of the intercostal arteries by the teeth of the saw tends to check hemorrhage, but there is often considerable shock, and it is therefore desirable to improve the general health of the patient beforehand by employing suction drainage to remove the septic discharge. This procedure will also reduce the size of the empyema cavity, and has even induced it to heal without any further operation.

THE THIRST CURE OF CHRONIC BRONCHIAL DISEASE.—Singer (*Deutsch med. Wochenschr.*, No. 5, 1912). Those cases of bronchial disease in which great quantities of decomposed or putrid sputum are coughed up from one or more bronchiectatic cavities are ordinarily extremely resistant to treatment. Drugs are usually of no avail. The writer has obtained very satisfactory results by rigidly restricting the intake of fluid. The patient begins with from one to three 'thirst-days,' during each of which he receives 200-400 c.cm. fluid. This may consist of water, milk, or soup. If the thirst is excessive, the patient may chew slices of lemon or eat one or two oranges. A little opium sometimes makes the thirst more bearable. The third or fourth day, the patient receives 1200-2000 c.cm. of fluid and then returns to his restricted regimen. The entire treatment, with two days of relaxation weekly, lasts from four to six weeks. The results were striking. The amount of bronchial secretion steadily grows less, the cavities, as shown by radiographic plates, grow smaller and are finally obliterated, and the cases, in which the treatment can be persistently carried out, usually result in a complete cure.

PERMANENT DRAINAGE IN ASCITES.—Osten (*Ther. der Gegenw.*, No. 11, 1912). In certain cases, in which repeated puncture of the abdomen would otherwise be necessary, the writer recommends the following procedure:—

The parietes are punctured by means of a trocar of wide bore; through the lumen of the latter, a sterile, soft rubber catheter is introduced into the abdomen, the trocar removed and the external portion of the catheter fastened to the skin by means of collodion and adhesive plaster. The catheter is then supplied with a pinch-cock and the patient can let out his ascitic fluid whenever he desires. Nothing could be simpler. One can thus empty one's abdomen as regularly as one's bladder.

THYROID THERAPY.—Stern (*Berl. klin. Wochenschr.*, No. 48, 1912).

The human thyroid gland contains a good deal more arsenic than that of sheep. It is not, therefore, strange that the effectiveness of the latter should be increased by the simultaneous administration of arsenic. A cardiac stimulant is also often indicated. For this purpose, the writer prefers some adrenal preparation, which improves the cardiac tonicity without having a cumulative action. He prescribes dried thyroid 5 cgrm., epinephrin 1 mgrm., and sodium cacodylate $\frac{1}{2}$ mgrm., several times daily. With this combination, satisfactory results were obtained in a number of cases of hyperthyroidism, a class in which he includes certain cases of baldness and pyorrhea alveolaris.

DIETETIC TREATMENT OF HYPERTENSION.—Hecht (*Zeitschr. fuer. klin. Med.*, Vol. 76, Nos. 1 and 2). An amelioration of pathological hypertension, by means of diet, is quite possible. The regimen consists in a restriction of meat, fluids, alcohol, salt and spices, the patient's diet consisting chiefly of raw and cooked vegetables.

TUBERCULIN TREATMENT OF HYPERTENSION.—Stern (*Wien. med. Wochenschr.*, Nos. 47 and 48, 1912). The observation, that the blood-pressure in tuberculosis is usually low, led the writer to try the effect of tuberculin injections in cases of hypertension. He used Koch's old tuberculin, in increasing doses, beginning with $\frac{1}{4}$ mgrm. The results were striking. In all cases a permanent reduction of the arterial pressure occurred, once as much as 40 mm. Hg. In angina pectoris the frequency of the attacks was diminished. The writer observed no ill effects, but our present views on hypertension should lead one to employ such a procedure cautiously.

THE CALCULATION OF DRUG DOSAGE FOR CHILDREN.—Dilling (*British Med. Journ.* November 2nd, 1912). The method suggested by the writer for

Age X 5	Age
the metric system $\frac{\quad}{100}$,	or for the imperial system $\frac{\quad}{20}$, results in

doses which correspond closely with those demanded by the average weights of non-adult individuals of both sexes at different ages. The calculation is simple, and the method can be employed for the metric and also for the imperial weight system.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

It is not a little curious that, almost coincidently with Prof. Schaefer's recent address, in which the possibility of the production of living matter by chemical, or chemico-physical methods was not obscurely hinted at, there should be, after long slumbering, a seemingly imminent revival of the old controversies of the 'seventies, concerning the spontaneous generation of forms of life. If the present position is to be realized, a clear distinction must be drawn between the views held by two schools of thought. We have, on the one hand, those who, like Prof. Schaefer, while denying, if not the possibility, at any rate the proved occurrence of the 'spontaneous' origin, in the world around us, of living matter from that which is non-living, yet look forward to the production, in the near future, of living matter by laboratory methods of synthesis. On the other hand, there is the school, for the moment represented in England by almost Dr. Charlton Bastian alone, that declares belief in the continued production around us, under certain conditions, by natural agencies, of living organic matter from that which is inorganic. A remarkable history attaches to Dr. Bastian's work and endeavors. More than forty years ago he, a young and brilliant physician, known to many as a philosophic thinker and investigator of unusual powers, and a personal friend of Herbert Spencer, believed that he had proved, by certain experiments, that under certain circumstances forms of life might appear in solutions, hermetically sealed in glass flasks, that had been subjected to heat believed sufficient to destroy any form of life that might have originally been present. There was an acute controversy; disciples of Pasteur, who was then at the zenith of his reputation as a scientist, ardently maintained that Dr. Bastian was wrong. Dr. Bastian, though unconvinced, withdrew from the field of combat, and pursued those researches which have made him so famous as a neurologist. It is noteworthy that, though much of Dr. Bastian's work in this field also was ardently controverted, time has fully and entirely vindicated him. It is only necessary to refer to his demonstration, years ago, that, in cases of complete transverse lesion of the spinal cord, the knee-jerks are lost; to his negation of the view that the centres in the Rolandic area are purely motor, and to his theories of aphasia (which form the basis of the now accepted views) in order that it may be realized how much work he has done. Yet the present writer remembers how, when a student, he was accustomed to hear it demonstrated that in each of these respects Dr. Bastian's teachings were incorrect. Now, they are so generally accepted that probably the fact that he first showed the right path is quite forgotten. However, on

retiring from active connection with hospital work, Dr. Bastian took up the threads which he had laid down, forty odd years before, and has since devoted his leisure to the prosecution and extension of his work on what is still called 'spontaneous generation.' It is worth remembering that until quite recently, except for some sporadic signs of revolt from Mr. Butler Burke and others, there has been complete apathy concerning the subject, since Huxley's address to the British Association in 1870. On that occasion that great man summed up heavily in favor of biogenesis—the doctrine that living matter always arises by the agency of pre-existing living matter—expressing himself as of opinion that, with certain limitations, this doctrine was (at that time) "victorious along the whole line."

But those who have followed Huxley have been, as some of us have thought, a little inclined to extend his dictum, that abiogenesis had not in 1870 been proved to occur, into a dogma that it cannot possibly ever occur, except under certain laboratory conditions which may one day be determined. It is one thing to say that Dr. Bastian has not proved his point, and quite another to say that it is impossible that anywhere in the world can such a thing as 'spontaneous generation' or even heterogenesis—the conversion of one form of living organism into another—be now occurring. In spite, however, of great passive opposition, Dr. Bastian has repeatedly, of late years, given accounts of his extended experiments, and, quite lately, before the Royal Society of Medicine, he read a remarkable paper printed in the "Proceedings" for December last. Those who are interested in the subject will doubtless read the original report, and I will only, therefore, say that some of the philosophical considerations brought forward appear to be worthy of far more attention than has been paid to them, and that it is earnestly to be hoped that competent investigators will at any rate repeat the experiments, and record their results. The day ought to have long passed by when a priori considerations could be raised in an attempt to show that observed occurrences cannot have happened. But, rather curiously, it is only a few months since a book, written by an enthusiast (Dr. Levenson) was published, giving some account of the work of Béchamp, the professor of Montpellier, whose life was one long series of disappointments, and embittered rivalries with Pasteur.

Béchamp's notion, to put it crudely, was that there exist, in the chalk formations, and elsewhere, certain elementary forms of living matter that he called microzymas, and which are capable of resisting marvelously prolonged and high temperatures, and which may become changed into living ferments—torulæ and such-like. Now Dr. H. Grasset, a month or two ago, published a little book, in which he supports Béchamp's thesis, which is, of course, that of heterogeny in a particular form. And he goes on to explain Dr. Bastian's experimental results as being really due to a process of heterogenesis. Grasset's views are referred to in the *Lancet* of January 25th, 1913, on page 261. Dr. Bastian, however, in a letter published in the *Lancet* of February 1st, 1913, vigorously combats Grasset's gloss on his findings, stoutly maintaining that they constitute no proof of heterogeny, but rather of true archebiosis—the origin of living matter from non-living matter. What measure of truth there may or may not be in Béchamp's views is not, however, for the moment so important as is the fact that there are distinct evidences that the whole question is about to be re-opened, and that it will not much longer be possible for any scientific body to refuse to admit it to discussion. The

direct interest of the subject to all medical men is very great, and I cannot forbear, in conclusion, referring to some suggestions made, many years ago, by the late Dr. Vivian Poore, one of the most ingenious physicians of the last century. Dr. Poore, who was a profound student, not of medicine alone, but of all matters than concern mankind, used to delight to point out the historical coincidence of terrestrial commotions, such as volcanic eruptions with great epidemics; and I often heard him speculate whether it might not be the case that forms of life, resistant to enormously high temperatures, may not exist in the interior of the earth, and, after being vomited forth at times of eruption, give rise to pestilences and to plagues. Most epidemiologists, if approached in their moments of leisure, will admit that there are many facts known to them that are quite inexplicable by any of the orthodox hypotheses; but it will perhaps be many years, if ever, before the doctrines of Béchamp and the suggestions of Poore find general acceptance.

But it will be well, perhaps, if we are not too hasty in assuming that Dr. Bastian is in error.

March 10th.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The February meeting of the St. Louis Medical Science Club was held at the Barnard (Free) Skin and Cancer Hospital, February 11th, at 8:15 p. m. Dr. W. E. Garrey presided. The following program was given:—

1. The Relation of Dose to Effect: Epinephrin on Arterial Rings.....L. F. Shackell
2. Quantitative Studies in Immunity of Mice to Tumor Inoculation.....Llewellyn Sale
3. Histogenesis of Multiple Carcinoma of the Skin.....Leo Loeb and W. O. Sweek
4. The Absorption of Fat-like Substances Other Than Fats....W. R. Bloor

(Signed) MOYER S. FLEISHER, *Secretary*.

THE RELATION OF DOSE TO EFFECT: EPINEPHRIN ON ARTERIAL RINGS.

By L. F. SHACKELL, of St. Louis.

The carotid arteries of sheep were used in the majority of experiments. The material was kept ice-cold until used. Transverse rings 1 mm. wide were suspended in Locke's solution by means of small glass hooks, one of the latter being attached to a light recording style. Locke's solution was kept at 38°C., and the total volume of fluid was in every case 25 c.cm.

To put different rings in a condition of tone, as nearly constant as possible, an arbitrary routine of stretching was adopted—namely, put a 10 gm. tension on the ring for fifteen minutes, then remove the weight, and five minutes later make a base line, add the epinephrin to Locke's solution, and record the constriction of the ring.

Under these conditions it was found that in concentrations of epinephrin, ranging from 1:1,250,000 to 1:250,000, the arterial constriction was proportional to the concentration. The same was true for arteries kept on ice for a week, except that the response with a given concentration of epinephrin was about one-half that of arteries excised but a few hours.

QUANTITATIVE STUDIES IN IMMUNITY OF MICE TO TUMOR INOCULATION.

By LLEWELLYN SALE, M. D., of St. Louis.

In a recent publication Loeb, Fleisher and White reported the results of a large number of experiments in mouse immunity to cancer. They

studied quantitatively the effect upon one another of two successive inoculations. The inoculations were done at six-day intervals with 75 mgrm. of tumor material. The virulence of the tumor was varied in a known way by heating *in vitro* for varying periods of time. As a result of their experiments they described three definite types of growth. (1) *Exclusive*. A virulent first tumor prevents the growth of a weak second tumor. (2) *Concomitant*. Two virulent tumors, two moderately virulent tumors—one very weak with another moderately virulent—exhibit this type of growth, the second tumor growing only if the first does, the second tumor retrogressing or not taking if the first tumor retrogresses or does not take. (3) *Mutually Exclusive*. If two very weak tumors are inoculated, both tumors very seldom grow together; if one grows, the other does not.

In my experiments the quantity of tumor inoculated was varied. Double inoculations at six-day-intervals were done with 75 mgrm. and 225 mgrm. of tumor. The effect of inoculations of tumors of varying degrees of virulence upon one another had already been established by Loeb, Fleisher and White. It was the purpose of these experiments to determine whether inoculation of larger quantities of tumor would modify in any way the results that Loeb, Fleisher and White had obtained. As a result of my experiments, it was seen that differences in the amount of tumor inoculated do have an effect on the immunity produced. If 225 mgrm. are inoculated six days after a first tumor, the first tumor grows less rapidly than it does when it is followed by smaller quantities (75 mgrm.) of tumor of the same virulence. There is no appreciable difference in the percentage of takes, growth, or retrogressions of the first tumor. A second tumor is unfavorably influenced by the previous inoculation of large quantities (225 mgrm.) of a first tumor. It grows less frequently than if preceded by only 75 mgrm., and its rate of growth is less rapid. In one instance, however, the growth of the second tumor was very favorably influenced by the precedent inoculation of 225 mgrm. of tumor. This was the case in those experiments in which a tumor whose virulence had been only moderately decreased (heated twenty-five minutes) had been inoculated after a very weak tumor (heated thirty-five minutes). Further experiments are to be done with this combination of tumors to see whether these results, at variance with the others, can be confirmed.

HISTOGENESIS OF MULTIPLE CARCINOMA OF THE SKIN.

By LEO LOEB, M. D., and W. O. SWEET, M. D., of St. Louis.

Examining serial sections of carcinomatous lesions in various stages of development in a patient afflicted with multiple carcinoma in the skin of the head and neck, we found that the first change leading to carcinoma consisted in a proliferation of some papillæ. The character of the proliferating cells changed, the nuclei became vesicular, the chromatin increased, and some mitoses appeared. In some cases the papillæ grew downward and sideward and united with other neighboring papillæ. Through liquefaction of the included connective-tissue and occasionally through liquefaction of some proliferating epithelium, cysts were formed. On the whole, infiltrative and proliferative power of the epithelial cells was not great. The resistance of the connective-tissue was in some cases

sufficient to prevent the epithelium from growing downward, the carcinomatous cells growing outward instead, and covering the neighboring epidermis. The carcinomatous cells growing outward were not accompanied by connective-tissue. On the whole, connective-tissue proliferation was either very slight or absent. Round-cell infiltration in the neighborhood of the carcinoma was frequently lacking, and if it was present it was a secondary phenomenon. There was no relation whatever between the downgrowth of epithelium and the presence of blood-vessels below the epidermis. We see, therefore, that any of the factors which have been held responsible for the origin of carcinoma of the skin by former investigators are absent. We have to deal primarily with an increased proliferative energy of the epithelium, which manifests itself simultaneously at various places. No definite statement as to the cause of this increased proliferative power can be made. We may, however, suggest that possibly certain abnormalities in the structure of the skin, which we find in the neighborhood of the carcinomatous processes, were associated with an abnormal metabolism and the production of abnormal substances which stimulated the epithelial cells.

THE ABSORPTION OF FAT-LIKE SUBSTANCES OTHER THAN FATS.

By W. R. BLOOR, of St. Louis.

The manner of absorption of fats is still a matter of opinion rather than a proved fact. Aside from the possibility of absorption through other channels than the chyle, it is an unsettled question whether all fat must be split before absorption or whether some of it is carried into the chyle intact. For testing the possibility that substances may be carried into the chyle with the split products of the fats, the petroleum hydrocarbon oils and also wool-fat have been used. The experiments previously reported* regarding the absorption of these substances, with one exception,** have had to do only with the recovery of unabsorbed material from the feces. In the experiments reported in this paper the fatty material, both of the feces and the chyle, have been examined.

First Part.—Mixtures of petroleum hydrocarbon oils (vaseline, white albolene) mixed with equal parts by weight of (a) olive oil (a fat rich in olein) and (b) cocoanut oil (a fat rich in saturated fatty acids and poor in olein) were fed to cats, and the amount of unabsorbed material determined in the feces using the method of Kumagawa-Suto.

Similar experiments were performed with wool-fat (lanolin). Practically all (over 90 per cent) of the substances fed were recovered from the feces.

Second Part.—Mixtures of the hydrocarbon oils with olive and cocoanut oils as above were fed to dogs and the chyle examined. None of the hydrocarbon oils could be detected in the chyle fat.

Conclusions.—The petroleum hydrocarbon oils when fed in solution in the fats are not absorbed to any appreciable extent. The same is true of lanolin.

*Henriques and Hansen (*Zentralbl. fuer Physiol.*, p. 313, 1900); Cohnstein (*Archiv fuer Anat. und Physiol.*, pp. 30-32, 1899).

**Bradley (*Proc. Amer. Soc. Biol. Chem.*, Baltimore, 1911).

BOOK REVIEWS.

SELECTED PAPERS ON HYSTERIA AND OTHER PSYCHONEUROSES. By Prof. Sigmund Freud, Vienna. (Second, Enlarged Edition.) Authorized Translation by A. A. Brill, M. D., Ph. B., Chief of Nervous Department, Bronx Hospital and Dispensary, Clinical Assistant Department of Neurology and Psychiatry, Columbia University. Nervous and Mental Disease Monograph Series No. 4. New York: The Journal of Nervous and Mental Disease Publishing Company. 1912.

In a former review of the first edition of the Nervous and Mental Disease Monograph Series No. 4 on hysteria and other psychoneuroses of Freud, the reviewer attempted to point out how great the service was that the *Journal of Nervous and Mental Disease* had rendered to American medicine by having translated Freud's work.

There is, perhaps, nothing more vital in neurology to-day than to understand and properly weigh the significance of Freud's work. This can only be done by carefully studying the fundamental papers that Freud and his students have published, and then by testing them out upon actual clinical material. When this is done, and only then, can one obtain a somewhat adequate conception of this whole newer, positive psychology as applied to the neuroses.

Of particular interest in the second edition are two papers—one concerning 'Wild' psychoanalysis, and the other "On the Future Chance of Psychoanalytic Therapy." The latter is a lecture delivered before the Second Psychoanalytic Congress at Nuremberg in 1910. The reviewer is very sure that anyone reading these two chapters, whatever his attitude towards Freud might be in regard to the truth or falsity of his theories, must be convinced that Freud's own attitude is strictly that of a man of science.

Freud calls attention to the dangers which result from the employment of psychoanalysis by those who have not mastered its technical difficulties. He says in his concluding paragraph: "It is therefore not enough that the physician should know some of the results of psychoanalysis, but he must also be well versed in its technique if he wishes to guide his medical actions by a psychoanalytical viewpoint. These technicalities cannot be learned from books and are acquired through oneself, requiring great sacrifice of time, effort and success. Like other medical technique, it is best learned from those who have already mastered it." This seems to the reviewer so sensible a point of view that it should invalidate most of the violent attacks that have been made against the whole Freudian psychology.

The concluding paragraph of the chapter entitled the future chances of psychoanalytic therapy deserves quotation: "I should therefore like to dismiss you with the assurance that you perform your duty in more than one sense if you treat your patients by psychoanalysis. You not only work in the service of science by making use of the only and never returning opportunity for fathoming the mysteries of neuroses. You not only give the patient for his suffering the most effective treatment now at our disposal, but you also contribute your share to that enlightenment of the multitude from which we expect, indirectly, the most thorough prophylaxis against neurotic diseases."

The reviewer heartily recommends to the neurologist and to the advanced internist the careful reading of this book. Whether the whole Freudian psychology should turn out to be a tissue of falsehoods, based upon faulty observation, unjustifiable conclusions or not, it is incumbent upon an active worker in the field of medicine to know something about the Freudian school and its effort to study and to understand the difficult and confused subject of the neuroses. Outside any particularly practical benefit to be gained, there is a certain intellectual exercise in attempting to understand and follow the series of studies which have built up the present Freudian structure. It is a part of the evolutionary development of medical thought that we are at present passing through, and to anyone with the proper spirit of inquisitiveness the chance to share in this effort should be eagerly grasped.

A word might be said in conclusion in regard to the translation. The translator, Dr. Brill, in his introductory remarks calls attention to the difficulty of gathering together material so widely distributed and so constantly changing into a complete structure. He might also have called attention to the difficulty of adequately translating the phraseology which Freud has employed. The use of new terms, singularly unadapted to English equivalents, makes the translation a task. For this reason, criticism directed against the translator's use of English should be given in a very mild spirit. Yet there are evidences throughout of carelessness and clumsiness in the choice of words, which, perhaps, in a future edition might be avoided. Other than this, the translation must be said to be satisfactory; and while at times there is a lack of smoothness of idiomatic selection, yet the meaning is never confused. This, after all, is probably as much as any translation of a work of this kind can be expected to offer.

A translation of Freud's psychopathology of every-day life and wit and its relation to the unconscious is promised, so that in the near future ignorance of Freud's writings cannot be accepted as an excuse for not understanding the Freudian school.

DIAGNOSE DER SIMULATION NERVOESER SYMPTOME. Ein Lehrbuch fuer den Praktiker. Von Priv.-Doz. Dr. Siegmund Erben, Wien. Mit 24 Textabbildungen und 3 Taffeln. Wien: Urban and Schwarzenberg (Rebman Company, New York). 1912. Price, \$2.15.

The title of this book immediately attracts the attention of neurologists and others who have had to do with the litigation side of accidents. There is no more difficult thing than to determine in these cases the line that differentiates organically produced conditions from those which the patient either consciously or unconsciously simulates.

In this book by Erben the subject of simulative conditions is taken up with great thoroughness and care.

According to the introduction, the standpoint that the author assumes is to consider disturbances of the nervous system chiefly from the point of view of simulation; therefore, in discussing the symptomatology of the various diseases which he writes about, he describes the methods by which the organically produced symptoms are discovered, and then shows how, by the use of the same or other manoeuvres, simulative symptoms may be detected.

As the author says, this book is simply an extension of the data that are found in better textbooks on neurology.

The arrangement of the text is very good, the descriptions are concise and the style is interesting. There are many illustrations, most of which are well selected and to the point.

There is considerable emphasis placed upon procedures, which to the American or English reader might seem a bit forced. The use, for example, of pilocarpine in order to test the action of the vagus in cases of neurasthenia, or traumatic neuroses, or the injection of adrenalin in attempting to cause the presence of glycosuria, are examples of experimental methods which would find little place in the procedures of the conscientious neurologist.

Some of the chapters are particularly well done. That on vertigo and nystagmus, with careful descriptions of the most recent technique according to Barany and others, is one of the best that the reviewer has been able to find on this subject.

Of particular excellence should likewise be mentioned the chapter on contractions, which contains a clear exposition of the methods by which the hysterically produced symptoms can be differentiated from those of an organic nature.

In the chapter on simulation of ocular palsies is contained, in a very compact space, simple methods by which the average practitioner can readily detect the more gross forms of simulation.

If there is one criticism which might be advanced, it is that the author is a bit too sure of his ability to differentiate conditions which are described. In spite of all his manoeuvres, there are cases surely which can only be detected after long periods of study, and against which the most accomplished series of experiments fail.

This book certainly fills a big gap in neurological literature. It is to be hoped that a translation in English will soon follow, as just at present there is particular need of some effective method which can be used, especially in the trial of cases before juries, in which unjust damages are sought.

The reviewer, therefore, earnestly recommends this book, and a word of appreciation of the author is in place for the service which this book can render to neurologists in solving the problem of simulated disease.

HYPNOSIS AND SUGGESTION. Their Nature, Action, Importance and Position Amongst Therapeutic Agents. By W. Hilger, M. D. (of Magdeburg). Translated by R. W. Felkin, M. D., F. R. S. E., with an Introduction by Dr. Van Renterghem (Amsterdam) Translated by A. Newbold. New York: Rebman Company. 1912. Price, \$2.50.

Hilger's book on hypnosis and suggestion is one of the few that have recently appeared on this subject, which demands serious attention from the reviewer. Most of the books of this class contain, as a basis of their arguments, badly reported clinical cases in which results of hypnotic treatment are given. For the medical reader dissatisfaction grows with the feeling that the case reports are inadequate, and the conclusions in regard to cure are frequently unjustifiable. The unusual excellence of Hilger's book consists in the fact that his case reports are not evidently given as case reports, but merely as instances illustrating some of the psychological points which are described. For this reason, if for no other, the reviewer is inclined to look upon it with great favor.

Hilger is a physician of Magdeburg, Germany, who has devoted a great many years to the study of hypnotic and suggestive therapeutics and has studied with care the literature on the subject.

The introduction by Van Renterghem is very interesting and gives in rather brief space an outline of the development of psychotherapy by the appearance of Dubois' work.

The body of this book is taken up with a description of hypnosis and suggestion from the standpoint of its physiology and psychology.

A basis for the explanation of hypnotism is laid by a chapter devoted to a description of the nature of sleep and partial sleep and a consideration of physical and mental reflexes. This is followed by chapters on suggestion and will and exercise of will. It can be easily seen from this that the conception which the author has of hypnotism is a very broad one, embracing practically all methods which at present we call psychotherapeutic or re-educational.

The last part of the book is devoted to methods by which various kinds of hypnotic suggestions can be applied in individual instances of disease. This is by far the least interesting and instructive part.

One of the chief excellences of the book is the fact that the author describes with clearness the various sources of mental training which have come to be grouped under the term psychotherapeutics. The training of the will by Levy, Freud's psychanalysis, and various other varieties of psychotherapeutics are clearly described, and they are criticised with fairness and judgment.

The translation cannot be commended. From time to time there are errors of a grammatical and constructive nature which are somewhat irritating, and in one or two places the meaning is confused.

This book can be recommended as one of the best of the shorter treatises that have appeared on this subject. It certainly is one of the few which escape entirely the taint of charlatanism and mystery. As an outline of the present studies of psychotherapeutics it can be unhesitatingly recommended to those who are interested in the psychoneuroses.

CEREBELLAR FUNCTIONS. By Dr. André-Thomas, Ancien Interne des Hôpitaux de Paris. Translated by W. Conyers Herring, M. D., of New York. With 89 Figures in the Text. *Nervous and Mental Disease Monograph Series No. 12.* New York: The Journal of Nervous and Mental Disease Publishing Company. 1912.

Nervous and Mental Disease Monograph Series No. 12 is a translation of Andre-Thomas' well-known work on cerebellar functions. This monograph consists of a well-planned arrangement of our knowledge of the cerebellum. It contains not only the anatomical facts, but likewise the results which have been observed after various experiments on the cerebellum of animals, particularly of monkeys.

The anatomy of the cerebellum is particularly good. The illustrations are well chosen and are sufficiently numerous to give the reader a knowledge of the successive arrangement of the various tracts and fibers in the cerebellum and its connections.

Chapter II. is devoted to the recount of experiments which are largely devised for observing the behavior of animals after portions of the cerebellum have been taken out. These are all personal accounts, and derive their value chiefly from the close observation of resulting symptoms rather than from theoretical deductions from other sources.

Chapter V. is devoted to the consideration of the symptomatology of the

affections of the cerebellum, and contains in a brief way practically all the positive knowledge that we have at present on this subject. Various recent symptoms observed in cerebellar tumors are described with clearness, and their importance is noted with sharp, critical insight.

The last few chapters are given to the consideration of the more theoretical aspects of cerebellar functions and the place that the cerebellum occupies in the general scheme of voluntary and involuntary movements.

The bibliography is very complete and contains practically all the important contributions of the literature up to 1909.

Although the subject of cerebellar functions is not sufficiently advanced at the present time for anyone to present a working basis for the interpretation of symptoms, yet, as far as our knowledge goes, this book may be said to be fairly comprehensive. The translation is well done and there is a very definite attempt, apparently, to convey into English some of the accurate qualities of scientific French. The reviewer knows of no work in English which can quite take the place of this translation. To have in a compact form a small monograph on the subject of the cerebellum is a great advantage to the neurologist.

The most positive criticism that might be given to this treatise is, apparently, the total neglect of the recent work of Barany and his pupils. No treatise of the cerebellum is quite complete without the consideration of this work.

TROPENKRANKHEITEN UND TROPENHYGIENE. Von Prof. Dr. Reinhold Ruge, Marine-Generalarzt in Kiel, und Dr. Max zur Verth, Marine-Oberstabsarzt in Kiel. Herausgegeben von Prof. Dr. Ph. Bockenheimer, Berlin. Mit 8 Karten und 201 Abbildungen im Text. Leipzig: Verlag von Dr. Werner Klinkhardt. 1912. Price, 13 m.

This handy and practical manual is of a type that is entirely too rare in German medical literature. Our German confrères abound and excel in encyclopedic and exhaustive compilations and monographs in most departments of medicine, but such a thorough, practical, well-balanced and withal clearly and pleasantly written treatise of this size dealing with a broad and complex field of medicine like that of tropical diseases is indeed a treat to the reviewer.

The book is divided into two sections devoted respectively to Tropical Hygiene and to Tropical Diseases; the first section being written entirely by Dr. zur Verth, and the second by the two authors jointly, credit being given for the authorship of each chapter.

Under the first section such subjects as climate and acclimatization, residence in the tropics, water supplies in hot countries, the hygiene of expeditions, the care of the health of native populations, etc., are discussed. In the second section the principal tropical diseases are divided into groups, *e. g.*, infectious diseases (protozoal and bacillary), parasites (worms and arthropods), skin diseases, poisoning (by animal or vegetable poisons), and the cosmopolitan diseases in the tropics. An appendix contains comparative tables of Fahrenheit and Celsius thermometer scales and of English and American apothecaries' weights and measures.

The work is illustrated with 201 figures in the text and 8 maps. These latter show the geographical distribution of the principal tropical diseases.

While not attempting to cover the field occupied by such systematic treatises as Scheube's "Krankheiten der Warmen Länder" or Mense's "Handbuch der Tropenkrankheiten," the present work is, nevertheless, complete enough to be of considerable value for reference, and at the same time concise and wisely proportioned to an extent that fits it for general reading or a student's text.

The writer heartily recommends it to all students of tropical medicine and hygiene who read German.

CLINICAL DISORDERS OF THE HEART BEAT. A Handbook for Practitioners and Students. By Thomas Lewis, M. D., D. Sc., M. R. C. P., Lecturer in Cardiac Pathology, University College Hospital Medical School, Physician to Out-Patients, City of London Hospital for Diseases of the Chest. New York: Paul B. Hoeber. 1912. Price, \$2.00.

There can be but few engaged in the active practice of medicine, who are not aware that a new and important chapter has been added to our knowledge of the mechanism of the heart-beat during recent years. The newly-acquired information has been gathered by the employment of precise graphic methods. Those, who are engaged in studying the heart and its defects by means of special instruments, are fully conscious of the burden which awaits the stu-

dent or practitioner who has yet to bring himself abreast of the times in this field of knowledge.

The question, that is often put to some of us, is, In what degree is an acquaintanceship with the new methods essential or expedient in the routine of busy practice? The graphic study of heart affections is but one of many clinical and pathological subjects which has forged ahead of late years. While a medical man can ill afford to neglect the advance of a subject in which he practises, he may act in a too vigorous pursuit of one branch of medical science to the detriment of his knowledge in other directions. A universal and detailed acquaintanceship with medical science, as it exists to-day, is no longer possible, but it behooves all practitioners to grasp new principles and to be aware of their influence upon the care of patients afflicted with common maladies.

Thus while it is true that the more frequent cardiac lesions can be recognized without the use of the graphic methods, we must remember that much of our present-day knowledge of the significance of variations in the pulse-rhythm is based upon this sort of research, and that many obscure cases still require the use of these refinements for their elucidation.

While the investigator working with these methods will be familiar with its contents, the practitioner will find in the little volume a concise but adequate presentation of the subject.

LEHRBUCH DER SPEZIFISCHEN DIAGNOSTIK UND THERAPIE DER TUBERKULOSE. Fuer Aerzte und Studierende. Von Dr. Bandelier und Dr. Roepke. Sexte erweiterte und verbesserte Auflage. Mit einem Vorwort von Wirkl. Geh. Rat. Prof. Dr. R. Koch. Wuerzburg: Curt Kabitzsch. 1911.

A volume of some three hundred pages which has gone through six editions since 1908 must have much to recommend it. It is a striking example of the specialization in medicine to read how very much work has been done on a subject which, important as it is, occupies only a small part of the practitioner's attention; and it is likewise a striking sign of the limits of specialistic enthusiasm to read the important rôle which tuberculin must play in the fight against tuberculosis! In this book the authors give practically all there is known concerning tuberculin in diagnosis and treatment, and they impart their information in such a lucid, interesting manner that one almost subconsciously agrees with their conclusions. But when one leaves the volume for a while, and reflects in an atmosphere not so satiated with the specialist's enthusiastic outpourings, one becomes slightly sceptical. In fact, did we not know that the same authors have published another book on tuberculosis in which the other factors in the fight against the disease are discussed, we might even rebel against such wholesale praise.

But these remarks are not to be construed as criticism. As an encyclopedia of information the volume is most excellent, and probably nothing would be found missing. The German is fluent, the style easy and can be understood by anyone who has a moderate knowledge of the German language. We cannot help from noticing, either as a commentary on the lack of American studies or on a lack of insight into American literature, that in the long list of references only one American man of science is mentioned. His name is Noguchi, and his article was published four years ago in the *Zentralblatt fuer Bakteriologie und Parasitenkunde*.

MUSCLE SPASM AND DEGENERATION IN INTRATHORACIC INFLAMMATIONS. Their Importance as Diagnostic Aids and Their Influence in Producing and Altering the Well-Established Physical Signs, also a Consideration of Their Part in the Causation of Changes in the Bony Thorax, and Light Touch Palpation. The Possibility and Practicability of Delimiting Normal Organs and Diagnosing Diseased Conditions Within the Chest and Abdomen by Very Light Touch. By Francis Marion Pottenger, A. M., M. D., LL. D., Medical Director of the Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. Sixteen Illustrations. St. Louis: C. V. Mosby Company. 1912. Price, \$2.00.

During the past few years a very interesting series of communications has appeared in the literature, from the pen of Dr. Pottenger, describing his two palpatory methods and discussing their diagnostic value. The methods are two in number. The first, based upon the observation that the muscles overlying areas of inflammation are thrown reflexly into a condition of spasm, consists in feeling and handling these muscles, recognizing their hypertonicity, and from this inferring a condition of more or less active inflammation in the tissues underneath. Its chief applicability is to the recognition of early apical

tuberculosis, though it is often of value elsewhere. The second, consisting in the lightest possible palpation, enables the observer to recognize by the touch the presence or absence of solid tissues or organs deep beneath the parietes. Thus the outline of heart or liver can be accurately determined by the sense of touch alone. The latter method requires far more training and practice than the former, but in our experience it is the more valuable of the two.

Hitherto, the fact that description and discussion of these methods have been scattered in the literature has acted as a bar to the general recognition of their value. Thus, the appearance in book form of an account of them from their originator is to be welcomed.

ON BRONCHIAL ASTHMA: ITS PATHOLOGY AND TREATMENT. By J. B. Berkart, M. D., Late Physician to the City of London Hospital for Diseases of the Chest, Corresponding Member of the Société Royale des Sciences Médicales et Naturelles de Bruxelles, etc. Revised and Abridged Third Edition. New York: Oxford University Press. 1911.

We must always welcome any serious inquiry into the nature of morbid processes, however greatly the conclusions reached may differ from the prevailing and long established views. For one to say that he has read Berkart's monograph with pleasure and profit does not imply that he casts aside the previous views as to the preponderating influence of the nervous system and spasm of the bronchial musculature in bronchial asthma, and accepts the ones here advanced. The author claims that bronchial asthma is dependent upon a chronic disease of the bronchial mucosa excited probably by bacteria or other irritant. The nature of the inflammation results in a tenacious bronchial secretion which, when it obstructs sufficient air-volume, gives rise to the paroxysm. The abnormal condition of the bronchial mucosa and its secretion is constant, but various factors may determine the time of the paroxysm, such as increased congestion of the lung due to slight incompetency of the left ventricle, catching cold, digestive disturbances and others. Treatment, therefore, is directed toward the chronic bronchitis, not toward the nervous system.

BEITRÄGE ZUR KLINIK DER INFektionsKRANKHEITEN UND ZUR IMMUNITÄTS-FORSCHUNG (Mit Ausschluss der Tuberkulose). Herausgegeben von Professor Dr. L. Brauer, ärztlichem Direktor des Allgemeinen Krankenhauses Hamburg-Eppendorf. I Band, 11 Heft. Wuerzburg: Curt Kabitzsch (A. Stuber's Verlag). 1912. Price, 20 m.

This, the first number of the new German journal for infectious diseases and immunity, promises well. The plan is to have the numbers appear from time to time, at irregular intervals, 30-35 sheets forming a volume, the price of which is 20 marks. It is to be the medium for the publication of important communications in this field as well as of collective abstracts of recent work. It is quite clear that no one, who is interested in this aspect of scientific medicine, can afford to be without this journal.

The number at hand contains a variety of interesting articles, one of them on febris herpetica being richly illustrated by a long series of photographs, both plain and Lumière. The number opens with an illuminating article by v. Behring on the basic concepts of immunity.

THE NEW PHYSIOLOGY IN SURGICAL AND GENERAL PRACTICE. By A. Rendle Short, M. D., B. Sc. (Lond.), F. R. C. S. (Eng.), Hon. Surgical Registrar, Bristol Royal Infirmary; Senior Demonstrator of Physiology, University of Bristol. New York: William Wood and Co. 1911.

There was a time when one man could be physiologist and surgeon too, but the rapid march of progress in each field has left a great gap between the sciences; and this is continually widening. The triumphs of the surgeon are unknown to the physiologist, and the converse is equally true. Yet many of the discoveries of the past ten years which have so changed the face of physiology are fraught with vast possibilities for the clinician. This book is an attempt to sift out from the new physiology that which is likely to be of value in the actual diagnosis and treatment of patients.

There are excellent manuals now published treating of the application of physiology to diseases which principally concern the consulting physician. This little book limits itself to surgical problems, and to the common every-day aspects of disease that confront us all—physicians, surgeons and general practitioners.

THE CARRIER PROBLEM IN INFECTIOUS DISEASES. By J. C. G. Ledingham, M. B., D. Sc., Chief Bacteriologist, Lister Institute of Preventive Medicine, London, etc., and J. A. Arkwright, M. D., Assistant Bacteriologist, Lister Institute of Preventive Medicine, London. New York and London: Longmans, Green and Company. 1912. Price, \$3.50.

The importance of the carrier problem in infectious diseases is not limited to those interested in the science of bacteriology, for the problem is a real one facing every physician who may treat a case of infectious disease. In this book attention is confined to typhoid, paratyphoid, diphtheria, epidemic cerebrospinal meningitis, dysentery, and cholera, and the subject is certainly thoroughly handled and brought well up to date. The lucid style and the conservative reasoning employed by the authors make the book of great value not only to epidemiologists and bacteriologists but to practising physicians as well. The discussions on typhoid and paratyphoid fever might well occupy considerable attention from hospital authorities, who, as a rule, consider their duties ended when the patient leaves the institution labeled 'cured.'

THE CARE OF THE INSANE AND HOSPITAL MANAGEMENT. By Charles Whitney Page, M. D., Assistant Physician Hartford Retreat, Hartford, Superintendent Connecticut Hospital for the Insane, Middletown, etc. etc. Boston: W. M. Leonard, 1912. Price, \$1.00.

This is a valuable little book, written by one whose experience has been coincident with the growth and development of institutional treatment for the insane in this country. Almost every subject of importance in the establishment and development of institutions of this kind is touched upon in this book. The style is lucid, clear and entertaining.

This book is recommended for officers, medical or otherwise, of institutions for the treatment of the insane. It should also be in the hands of those whose interests tend towards the medical or social betterment of the insane and feeble-minded. It is a safe book to be in the hands of the non-medical reader, and will give him a view of the more intimate problems of treatment of the insane than any book that has recently appeared.

THE STORK BOOK. By Newton Newkirk. Illustrations by Wallace Goldsmith. Boston: H. M. Caldwell Co. 1912.

There is probably nothing that the young mother of the newborn needs more urgently than cheerful encouragement in her various troubles. Good advice is always abundantly supplied by physician and nurse, and—as the author of this delightful book assures us—by grandmothers, aunts and others who know nothing about babes. Everybody coming into contact with the young mother seems to consider it his or her bounden duty to warn her, to frighten her, to correct her faulty ways and views. This situation is unbearable and calls for change; and to bring it about the author no doubt has written this very witty little volume. In our belief, it will be welcomed by the young mother with more enthusiasm and be read with more general satisfaction than the average volume on the care of the infant, which is forced into her hands when she is already overwhelmed by the responsibility thrust upon her with the arrival of the first child.

RADIUM AND RADIOACTIVITY. By A. T. Cameron, M. A., B. Sc., Lecturer in Physiological Chemistry, University of Manitoba, etc. New York: E. S. Gorham. 1912. Price, \$1.00.

It is necessary in any discussion of this new subject to presuppose an elementary knowledge of physics and chemistry. This small book presents radioactivity in as simple a manner as is possible in this highly specialized department of modern scientific advancement. Such a book naturally will be welcomed by those scientifically inclined in their reading though not actively interested in the deeper problems. It may also be heartily recommended as a textbook for students.

MAKING GOOD ON PRIVATE DUTY. Practical Hints to Graduate Nurses. By Harriet Camp Lounsbury, R. N., President West Virginia State Nurses' Association, Sanitary School Inspector for Charleston Independent School District. Philadelphia: J. B. Lippincott Company. 1912. Price, \$1.00.

The aim of the writer is clearly set forth in the title of this little volume. Such topics as the nurse in her relation to the patient and the patient's family, the duties to herself, the nurse as teacher and dietist, etc. are discussed in a manner which should prove instructive and interesting to every nurse.

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EDITORIAL.

IS MODERN ART AN HALLUCINATORY OBSESSION?

Now that the Independents have come among us to disturb the even tenor of what constitutes our sheltered thought in regard to art, it would be well to ask ourselves if what they are giving us is a reflection of the modern way of looking at things, and to what extent we would rather be brought face to face with our own physical and mental defects than be subjected to the iteration of gazing on Apollos and Venuses whose perfection of form is unknown in actual life. To take up the first query, Have the paintings which have heretofore been exhibited kept pace with the revolutionary changes which have affected literature in the last decade, and if they have not, must art continue on the old lines just because some of us have ordained that it must express only the beautiful? It cannot be gainsaid that directly we are brought into the presence of a picture we are greatly shocked if something is depicted that has not the tendency to ennoble us so that, for the nonce, there may be a complete forgetfulness on our part of our petty meannesses, our moral defects, and the consciousness of the fact that the form we are looking at bears but a greatly idealized relation to what we know really exists under our own clothing. We do not demand to-day perfection of physical attributes in literature; a fact which is well illustrated by our lack of interest in the few fictional characters which occasionally are thrust upon us by writers who are not yet completely dissevered from the methods peculiar to the novelists of former generations. Now if there is to be a closer connection between art and literature, if the psychology of the age, which is quite rampant, demands this, why should we be so greatly surprised that the Independents are traveling along so many unbeaten paths in attempts to arrive at this alliance? But what is more im-

portant, since it cannot be denied that painters from now on will insist upon reflecting modern thought, is our second query, to wit, To what extent do we prefer the ugly but truthful in art to what is beautiful but untruthful?

In the work of the Independents which has been shown in New York and Chicago—the Independents are either Post-Impressionists, Futurists or Cubists—there are pictures and plaster figures that are ugly and truthful and others that are ugly and untruthful. And besides, there are some that are so puzzling that the mind recoils from any interpretation that could be considered sane. Take, for instance, the much-talked about picture entitled "Nude Descending a Staircase" by Marcel Duchamps, or his "King and Queen Surrounded by Nudes." The first has no nudity to the eye of greatest acuity of vision, in fact looks as if the nude figure was so greatly surprised to find herself in the presence of the artist that she gave one well-aimed jump through a plate glass window, and having taken the precaution to cover her body with some sticky substance so that everything that might come her way will stick, is saved, from the embarrassment of being seen, by the many pieces of glass which completely cover her form. And the second is just as bewildering and indecipherable. But to counterbalance these vagaries, which pass the understanding of man, there are others which, while ugly, are illustrative of the desire of the artist to lead us into paths which will ultimately make us recognize that even art need not confine itself to the idealization of life, but be an integral part of the sort of education that not only broadens the mind but makes it cognizant of our mental and physical defects, and thus be the means of implanting in our bosoms a deeper sympathy for the imperfections of mankind. Were Masriéra's "Nightmare," Barret's "The Idiot," and Lamour's "Cretin of Valais" in the collection, our point of contention would be better understood. But though these were exhibited in Paris in the *Salon des Indépendants* for 1911, an unwise judgment has prevented their inclusion in the International Exhibition of Modern Art as seen in our American cities. And, worst of all, Kupka is not represented—the painter who made his canvasses worth studying on account of his life-like representations of the lowest types of Parisian society—*Yo la Vache* and *Un Alphonse: Le Terreur du Sébasto*: ugly, beastly humans disfigured by an animality to which only too many in great cities descend; but when once seen, as depicted by this artist, never to be forgotten.

Is all this latest phase of art an hallucinatory obsession? In *Æsculape* for September, 1912, is an interesting article entitled *Reflexions sur l'Art et les Aliénés* by Dr. H. M. Fay, in which the author

shows that some of the pictures painted or drawn by the alienated have points of resemblance to post-impressionism. To illustrate his contention he gives the reader a picture—Edmond Dulac's exquisite "Hecuba"—made over by a patient with dementia præcox, which is certainly in the manner of the Post-Impressionists. But all the other illustrations to the article are far removed from the new art; and, though the style of the one we have mentioned does recall the methods of Van Gogh and Odilon Redon, this fact alone can hardly be held up to an artist that he, too, is laboring under hallucinations. In our judgment of modern art we should not forget what Mrs. Carlyle said of "Sordello" or what Ruskin said of Whistler's paintings. Their opinions have been reversed by common consent; and while we may feel towards Wassily Kandinsky's "Improvisation" and Paul Picasso's "The Woman and the Pot of Mustard" just as they did towards the English poet and the American painter, let us as physicians not think too harshly of an art that is making for truth, that has had as a predecessor one Rodin, who has shown us the decay of body and of face in "The Old Prostitute," that has given us a Kupka, a Masriéra, a Barret, a Lamour. Surely these men are not victims of hallucinatory obsessions, but truth-seekers whose endeavors must find high favor with all who know that no matter how ugly the subject, if it is stamped with truth, it is worth while.

POTENTIAL DANGERS IN THE FLOODED DISTRICTS.

Fire, flood and pestilence are alike in that they are often traced to small, neglected beginnings. They further resemble each other in the fact that early recognition of danger may lead to avoidance of disaster.

In the presence of sudden devastation, like that caused by the great floods at present overwhelming part of our country, our attempts at relief of suffering and accident may, unless carefully planned, lead to greater loss of life than nature has exacted by the cataclysm itself.

The assemblage of large numbers of people into camps or hastily constructed hospitals and shelters is a grave matter, as we have learned time and again in stress of war. It is, therefore, a primary obligation of the medical profession to exercise care to prevent disease from creating greater havoc than has already been inflicted by fire, flood or storm.

Further, it must not be forgotten that the problem before those who have in charge the concentration and administrative care of our flood victims is not merely one of camp sanitation and the immediate protec-

tion of these unfortunates. Account must also be taken of the conditions that inevitably must face us after the floods.

Heroic efforts, great sympathy with uncalculating devotion will not prevent the invasion of infectious disease except under scientific guidance. What is absolutely needful is exact knowledge of the practical methods of preventive medicine applicable to the situations confronting us.

The detailed sanitary precautions to be observed in flooded districts, in order to prevent epidemic disease, are so many and vary so markedly, according to local conditions, that we will not attempt, in the short space of an editorial, to point out what should be done in each instance. Indeed, this would necessitate a personal visit to the stricken districts. The aim of these paragraphs is to sound the note of warning to those who may not realize the potential dangers in the situation and to encourage others upon whom heavy duties and responsibilities are laid by sudden events.

Nevertheless, it may not be out of place to recall some of the most important guiding principles applicable to our present problems.

In the first place, let us not forget the three great methods of transmitting infection: through insects, particularly flies; personal contact; and food, including water. Typhoid fever is the best known and most important disease that comes to mind at once in this connection. Let us remember that during our late war this disease developed in more than 90 per cent. of the volunteer regiments within eight weeks after going into camp, and speedily became epidemic in camps located in the northern as well as the southern states. Furthermore, it was found that from one-fourth to one-third of the men were susceptible to the disease.

The measures which may be adopted to prevent the spread of typhoid under present conditions must consist of (1) sterilization of all drinking water by heat, unless an ample supply, unimpeachably purified by large filtration plants, is available; (2) disposal of animal and human excreta and garbage so as to avoid contamination of food and water and also to reduce fly breeding to a minimum; (3) the detection and isolation of early cases of typhoid, and particularly of apparently healthy typhoid carriers; (4) screening of milk, vegetables and fruits that are eaten uncooked and the protection of these from dust; (5) interdiction of the use of common drinking cups, sterilized thermometers and other objects that are put into the mouth; (6) the keeping of patients clean and the disinfection of their discharges. Soiled shoes of nurses and others are particularly to be kept in mind, as persons going about may thus carry infection to different parts of a camp, temporary hospital or quarters. Antityphoid inoculation is particularly adapted to such cir-

cumstances and should be widely, if not universally, practised in situations of this kind.

A rigid system of inspection should be inaugurated wherever people are congregated, and cleanliness of person, kitchens and quarters should be insisted upon. Those associated with the sick should be required to exercise particular care. Disinfection of all articles used by the sick should be practised, and articles that cannot be disinfected should be destroyed. Disposal of feces, urine, vomit, etc., should be attended to and incineration provided for, if possible.

In order to enforce these measures and other obvious hygienic principles, adequate police service and insistence upon cleanliness of sites and personal inspection are necessary.

In addition to the above suggestions, there remain the contagious group, especially measles, scarlet fever and smallpox, and also such affections as influenza, diphtheria and meningitis.

The presence of children, the crowding and other circumstances obtaining in time of flood are peculiarly the conditions favorable for the spread of such affections. Good policing and general cleanliness constitute sanitation under such circumstances. Attention to water, ventilation, food, especially milk, the destruction of vermin and the exclusion of domestic animals are necessary measures. Early diagnosis, prompt notification, the tracing of cases, isolation and disinfection constitute the essentials of action.

In order to accomplish this, the most important matter of all is the placing of each centre under the absolute jurisdiction of a skilled sanitarian. The Federal Government, State Governments and the cities hold themselves in readiness to furnish men entirely competent to deal with any situation amenable to modern sanitary science; and local pride, personal influence or political favor should not be allowed to cheat communities out of the services of the most highly trained available men in such times of misfortune and peril.

The flooding of large areas means widespread pollution of water supplies, and of streams. Often, not only cities lower down suffer from river pollution, but local conditions, such as mosquito breeding and inadequate drainage, need special attention as the floods subside. The lower Mississippi River region found this true last season; we trust, therefore, that investigation and necessary precautions for the morrow may characterize the hasty efforts of to-day.

The JOURNAL extends its sympathy and praise to the devoted physicians and brave sufferers who have compelled the admiration of the world through an exalted spirit of sacrifice, of courage and uncomplaining patience.

POSSIBLE CONTRAINDICATIONS FOR ANTITYPHOID VACCINES.

There is increasing evidence that the injection into our bodies of dead pathogenic bacilli of any kind will cause an immunity against living bacilli of the same species. Although these facts have been known for nearly twenty-five years, no one knows as yet how long the immunity will last, but everyone has hoped that it would be long enough to enable us to put the discovery to practical use in times of epidemics. In Asia, most attention has been given to the prevention of plague, cholera and bacillary dysentery by this method, while in America and Europe typhoid fever has been the object of attack. The results reported so far are exceedingly favorable; but the medical profession, remembering the sad history of tuberculin when it was given in large, fatal doses, has hesitated as to adopting the new prophylactic method. This caution was wise, for it has been reported by Spooner* that typhoid vaccine has had the effect of activating non-typhoidal disease which was latent or chronic at the time of the injection. Combe and Louis, of Paris, also report** that considerable care must be exercised to exclude other diseases before vaccination for typhoid is undertaken. They lay special stress on the contraindications for the use of typhoid vaccines, claiming that antityphoid vaccination ought not to be performed except in perfectly healthy subjects. Any acute affection, even the minor infections, such as sore-throat, pains in the limbs, influenza, enteritis, stomach troubles with fever, coryza, bronchial and pulmonary affections, acute gonorrhea, primary and secondary syphilis are sufficient to exclude its use. Most chronic affections are more important as possible contraindications. Special attention should be paid to the suspected tuberculous individual who, if inoculated with typhoid vaccine, may have a constitutional reaction with a rise of temperature, lasting for several days. This is really the fever of tuberculosis, the injection of typhoid antigen thus producing the same effect as tuberculin. An abnormal reaction in a subject who does not present any obvious trace of this disease, in the absence of a previous attack of typhoid, according to these authors, must be suspected of latent tuberculosis. In cases with a history of past tuberculosis, though apparently cured, and in which the general health is satisfactory, antityphoid vaccination, if required, should be given cautiously—five injections instead of four in the following doses: $\frac{1}{4}$ c.cm., $\frac{1}{2}$ c.cm., 1 c.cm., 1.5 c.cm., and 2 c.cm. $\frac{1}{4}$ c.cm. is given to begin with in order to estimate the susceptibility of the in-

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dividual. After giving this first injection the patient should be instructed to take his temperature; and, if the constitutional reaction that follows is at all marked, it is preferable to discontinue the vaccination. Combe and Louis claim that malarial subjects may undergo the treatment in the intervals between the attacks. However, it is necessary to give them fifteen grains of muriate of quinine with each injection, seven hours before the usual time for the onset of the attack. Failing this precaution, the injection of vaccine acts as would a chill, a fatigue or an injury, viz., it may awaken a malaria which is dormant and bring on the attacks. Inactive syphilitic subjects who are not debilitated bear no contraindications to this vaccination.

Cachexia from any cause, organic heart or kidney disease, diabetes, mucous colitis are held as contraindications. The vaccine is reported as producing albumin in the urine, or disease having albuminuria, but this is the same effect produced, without harm to the patient, by the injection of any alien albumin.

In females during the menses and in debilitated, exhausted, fatigued subjects, vaccination had better be postponed to a later date and proceeded with as soon as the general health is judged satisfactory.

As an immunizing agent must be safe in any and all conditions, Combe and Louis believe that it will be absolutely unsafe to adopt this procedure in civil life, for reasons already mentioned.

OPINION AND CRITICISM.

WALT WHITMAN: A MEDICAL CRITICISM.

Thanks to Dr. W. C. Rivers, who has recently written on Walt Whitman's sexual life,* we are in a position now to say that a goodly number of the poet's rhapsodical poems—those especially in which he put forth his ideas of female strength and male perfection, in the anatomical sense—were inspired by his being a *wecibling-urnig*. The author is so positive of this, that such sureness of diagnosis must be considered as the outcome of much investigation—of course, uninfluenced by any prejudices for or against the subject—and cannot be lightly passed over. But on what does he base his theory, on what facts does he build the superstructure that shall make us spurn one whom we are wont to read with interest, make us doubt those glorious improvisations to strength, beauty and health? Not the Peter Doyle incident in the poet's life: that, indeed, has been overworked by all the little minds that have attempted to ferret out moral deflections in Whitman's career; but a number of poems are quoted, typically Whitmanesque, and from these the positiveness of the diagnosis is reached. Dr. Rivers may be all that a good and honest physician should be; but when he wants to drive home a truth he is just what so many good and honest physicians are—a rabid admirer of his own opinions and a sad neglecter of what a great man's philosophy may have been—his outlook on life, his passionate longing for reform, his hope of a morrow that shall have, as its hallmark, strength of body, strength of mind, and a horror of all those mental imperfections which have produced prejudice, narrow-mindedness, and meanness. This charge, which we make against Dr. Rivers, has been made by others against medical men who rush into criticism when but ill-prepared, and especially in the case of Whitman's private and literary life is a complete understandingness necessary to mete out justice. As we take it—and we do not pose as any too well read in Whitman's lore—he was above all a deep admirer of Nature. A man or woman was to him a being unclothed; and, when he wrote about either, the thought which was uppermost in his mind was to tell, in his own peculiar way, what man or woman should be in a physical sense. This was the Greek idea; and, though at the time of the publication of his poems the so-called new note was altogether too audacious to be countenanced, he brought into literature a something that had never been so outspokenly treated before. Before his time the mythological gods and goddesses were constantly the poet's theme; they were trotted forth by the great and small as fit subjects for poetical excursions; but real men or women were shunned. But with Whitman what he saw around him, whether it

*Walt Whitman's Anomaly. London: George Allen and Company. 1913.

was the ocean, the trees, the flowers, men, women, ships, crowds, the greatness of life untarnished by despicable littlenesses, was meat for his mind, and when he sang of them he used language that was brutally frank. To him human beings were what they are to the anatomist and the physiologist—working organisms of muscle, lung, heart, kidney and sexual organs. The last may have engaged his attention more than was customary with the poets who preceded him; but his largeness of vision could not exclude them from his complete picture of man. The permissibility of a candor that stops at nothing may be questioned; though with Whitman, whose poetry made ducks and drakes of all previous polished and refined verse, the thought that he dwelt on this tabooed subject for its vulgar essence is not reading him in the proper light. Of course, as Dr. Rivers points out, there is the poem which begins, "When I wander'd alone over the beach"; but even here, though it must be said that never before has such candor been practised by any other poet in his writings, there is enough of the rhapsodical to make one think that, instead of describing a perversion, the poet was indulging in a frenzy of enthusiasm to bring to light a revel that was more mental than physical. But all the rest in this book is pure nonsense; and to increase the suspicions which already have gathered around Whitman's fame, in the matter of his possible perversion, by the publication of a book of this nature, is the sort of defamation that was visited on Shakespeare some years ago when the mysterious W. H. of his "Sonnets" was supposed, and even positively stated, to be a man.

AND THE USELESSNESS OF IT ALL.

That pessimism should be the dominant note of literature to-day is not at all surprising, considering the popularity of such writers as Schopenhauer, Nietzsche, Ibsen and Strindberg; but that its fangs should at last be fastened into the high optimism of medical matters is indeed something that may be considered quite unexpected. Who has not remarked in nearly all our medical journals the buoyant manner in which the gravest subjects have been treated, the rush and roar of the writer, his faith in himself, his indomitable will to conquer what was heretofore considered impregnable, his delightful egotism that must perforce be effulgent even though the cases he reports number but two! Now though the article we are about to mention as a counterblast to this happy-go-lucky sort of writing is not on a subject which usually graces the columns of our medical journals, its content is not so unimportant that the critical can say in all justness that it is of small moment whether an optimistic or pessimistic manner is affected in its presentation. Reference is here made to Dr. Horace Greeley's paper on "Beauty Doctoring" in the *Medical Record* of January 18th, in which so pessimistic a note is sounded that even while reading it the most stolid reader will be affected by a sensation germane to a fear neurosis that he, too, is at present, or liable to be in the very near future, the victim of such incurable disturbances as baldness, wrinkles, and a persistently growing paunch.

After reading Dr. Greeley's weighty words carefully one cannot but be impressed with the fact that Nature is greater than man, and that when this Inexorable Force of the female gender says hair must fall, wrinkles cannot be avoided, and fat will creep in where not wanted, all our valiant fight against these dire invasions will be of no avail. And being impressed, would it not be folly to desire those hundred years for each life, which Metchnikoff says can be ours if we will but affiliate ourselves with the Bulgarian bacillus, and many Carlsbader doctors state to be a possibility if we will but look after our diet and take some cognizance of our arteries in the salubrious surroundings of Carlsbad! But who would crave a change from the biblical three-score and ten if the decay shall proceed at a merry pace, or rather if already at the comparatively youthful age of fifty greying hairs are a fixture that is proof against all artifices, teeth must drop from their sockets, and wrinkles and the tell-tale hollows in the cheeks and neck cannot be eradicated.

In these talkative and writing days of preventive medicine the pessimistic note of Dr. Greeley's paper should give us pause. It is so different from what obtains in 'popular' books written by dermatologists, in 'popular' articles in various weeklies and monthlies and even in our recognized medical journals, that the thought of the reader is at once concentrated on the futility of putting up a fight against Nature. Moreover, in his acceptance of the unavoidable, the author is a bit of a Tolstoian, and perhaps this is not an attitude to be too greatly condemned; for have not all physicians been brought face to face with cases that have proved beyond a doubt that medicine cannot always circumvent the machinations of Nature? Still, though one would be only too willing to grant Dr. Greeley that measure of approval which his words must call forth from all intelligent minds, such are the many weaknesses of mankind that we hope even in the face of our greatest disasters. And to prove that this hope is not builded on sand, the writer of these lines would call, not only Dr. Greeley's attention, but that of all physicians who are interested in the subject, to recent copies of *Esculape* and *Paris Médical*, two French journals of high standing, which respectively carry advertisements to this effect: *Dépilatoire Hospitalier, dissout le poil comme l'eau dissout le sucre . . . le poil repart parfaitement après une première application; puis la repousse se fait de plus en plus lente, de plus en plus grêle, de plus en plus pâle à la suite des applications successives plus de repousse à la longue—atrophie de la papille pileaire que le Dépilatoire a pénétrée, "mordue," lésée* (Hospital Depilatory, dissolves hair as water dissolves sugar; the hair reappears perfectly after one application, then it grows again more slowly, is much thinner and paler following successive applications; and in the end does not grow again—atrophy of the papilla pili when the depilatory penetrates, "corrodes" and injures)—Dr. Greeley, by the way, gives no quarter to depilatory preparations—and *L'Eau de Jeunesse Jane Hading*, which is said to dissipate wrinkles forever, to bring back to parchment-like complexions a freshness and color that is nigh magical. And who has not reveled in Sabouraud's weekly prescriptions for alopecia?

ORIGINAL ARTICLES.

TUBERCULOSIS OF THE KIDNEY.*

By DANIEL N. EISENDRATH, M. D., of Chicago,

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The chief object of this paper is to call the attention of the general practitioner to the existence of a disease which occurs far more frequently than he is apt to think. The larger the number of cases of tuberculosis of the kidney, which are seen by those competent to judge, the more positive has the conviction become that if they were only diagnosed at an early stage, many more could be saved from a lingering, painful and necessarily hopeless illness, than is now the case. Before entering upon the subject in detail, the writer will emphasize certain conclusions which have been reached from a study of nearly 1,500 operated cases, including a number of his own. First, in the early months of the disease, only one kidney is affected in over 90 per cent. of the cases. Secondly, when the diseased kidney has been removed early, the operative, *i. e.*, immediate mortality was a little over 2 per cent., and the late or remote (first five years) mortality not much higher. Even in the latter the mortality is far less than it would have been if the condition had remained unrecognized or not subjected to operation. Thirdly, whereas we recognize the fact that pulmonary and many other forms of tuberculosis will heal under hygienic and other non-operative measures, no authentic case of tuberculosis of the kidney exists, which has recovered under similar, *i. e.*, non-operative treatment, without complete loss of function of the kidney.

The tubercle bacilli first reach the involved kidney through the blood current (hematogenous infection) in the majority of cases. The chief danger of permitting a unilateral case of tuberculosis of the kidney to go unrecognized, is the tendency of the disease to involve the other kidney by way of the bladder and along the ureter. The writer excludes from this danger, of course, all cases in which the infection of the kidneys, even though it be only on one side, is a complication of a similar disease of the lungs or genitals. We shall see that even where tuberculosis of the kidney is a result, direct or indirect, of the same condition in the epididymis or Fallopian tubes, that the prognosis, although unfavorable enough, is greatly improved by removal of the kidney, if the disease is only present on one side.

Having advanced the above conclusions, the writer will attempt in as

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non-technical a manner as possible, to prove their correctness by a brief survey of what we know about the disease.

PATHOLOGY.

It is necessary to distinguish between descending or hematogenous and ascending or urogenous modes of infection. In the hematogenous form the bacilli enter the kidney through its arteries, *i. e.*, from the general circulation, and instead of being excreted are arrested, and the various pathological changes, such as infiltration, caseation, etc., begin. Miliary tuberculosis of the kidney, which is a part of a generalized infection, is, of course, excluded from consideration here. The bacilli usually lodge

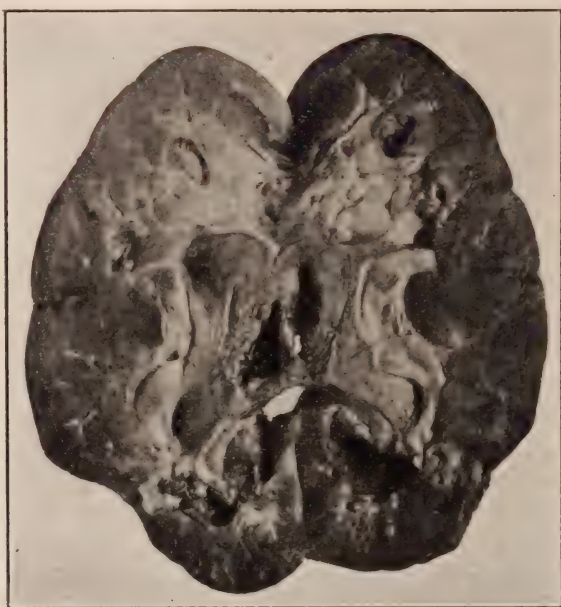


Fig. 1.—Tuberculosis of kidney at an early stage. Note the cavity formation at upper pole and adjacent thereto several typical caseating foci. Also note large tubercle just above cavity, seen on left half of picture. Also note miliary tubercles in pelvis of kidney and around cavity in upper pole in both halves of kidney.

in the parenchyma so that one sees cases in the early stage where, as in Fig. 1, there is a chief focus in which the typical infiltration and formation of cavities is seen, associated with more or less nodular involvement of the entire parenchyma. In other cases the chief seat of the disease is in the apices of the papillæ, resulting in extensive ulceration of the structures. As the infection spreads, more and more of the parenchyma undergoes the changes so typical of tuberculosis in other tissues—namely, either the formation of granulation tissue, or of miliary tubercles with subsequent caseation and the formation of larger or smaller cavities. In the early cases the cavities are filled with the typical cheesy debris, the result of destruction of the kidney parenchyma, each cavity being limited

by an easily distinguishable membrane or capsule. In older cases the entire kidney is converted into a series of spaces, each containing a putty-like substance, the result of further changes in the caseous detritus. The infection may remain limited to the kidney itself, but not infrequently the disease spreads rapidly toward the capsule (Fig. 2), and from here to the tissues round the kidney, forming a perinephritic abscess, or a fistulous tract which may open anywhere in the vicinity of the kidney. Extension downwards into the ureter takes place quite early, so that the pelvis of the kidney and the ureter ultimately become converted into rigid structures, so thick that in the female the thickened ureter can often be felt through the vagina as a thick pencil-like structure. These changes are rather late, however, but the disease has hardly secured a foothold



Fig. 2.—Tuberculosis of kidney complicated by colon bacillus infection. Note the typical cavity formation due to tuberculosis of upper half of kidney. Chief symptoms in this case were those of a perinephritic abscess with high fever and tenderness over kidney, and rigidity of adjacent abdominal muscles. After perinephritic abscess had been drained, temperature still continued, and exploration of kidney showed condition in picture. Nephrectomy. Prompt recovery.

in the kidney when the bacilli begin to pass, with the urine, in large quantities into the bladder and give rise to a cystitis, with the formation of tuberculous ulcers in the mucous membrane. This is one of the most important facts to bear in mind in the pathology of the disease. We shall see later that the bladder symptoms, which are so marked in the majority of cases, are directly due to the changes in the mucous membrane of the ureter and bladder from the action of the bacilli which have been carried down from the affected kidney.

The involvement of the opposite ureter and kidney can thus be readily understood. Whether the bacilli travel upward along the mucous mem-

brane or the lymphatics, or by way of the urine itself is only of interest to the pathologist. Suffice it to say that sooner or later the infection spreads in this manner from one kidney to the other, *i. e.*, by the urogenous or ascending route. The changes are quite similar in the secondarily infected kidney, but the disease is at first more marked in the renal pelvis and the parenchyma immediately adjacent thereto, than when the infection has been primarily through the blood current, *i. e.*, hematogenous as in the first infected kidney. The writer does not deny that there are cases where both kidneys are involved through the blood current at almost the same time, but such a primary bilateral involvement must be an exception. There are a few more facts in the pathology to which it is necessary to refer, as a knowledge of their existence is of considerable clinical importance. These are:—

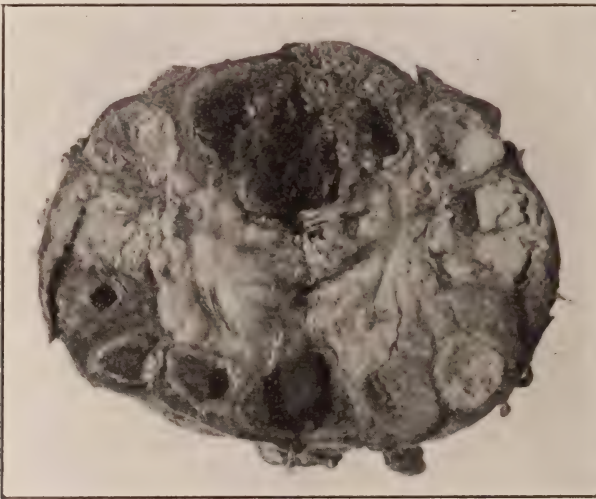


Fig. 3.—Tuberculous pyonephrosis. Note how kidney tissue is replaced by large caseous cavities. In this case there was little if any communication between the caseous foci and the renal pelvis. (Closed tuberculous pyonephrosis.)

1. That tuberculosis of the kidney may be either a complication of other conditions, or that these may be secondary to the original infection. The writer refers especially to the formation of calculi in a tuberculous kidney. In the majority of cases the calculi are probably the result of secondary infection.

2. Mixed infection with pyogenic organisms, especially the colon bacillus, may not only accelerate the kidney destruction, but change the clinical picture by giving rise to symptoms, such as high fever and other septic signs of pus infections of the kidney (Fig. 2).

3. There exists a group of cases known as closed tuberculous pyonephrosis in which extensive destruction of the kidney may have taken

place, but, owing to the fact that the foci do not communicate with the renal pelvis, the number of bacilli is few, if any, and the diagnosis is often not made until the kidney is quite large. The writer has recently operated upon several such cases (Fig. 3).

Tuberculous Hydronephrosis.—At times, instead of extensive destruction of the parenchyma, we find cases in which there is a marked hydronephrosis. In all probability such cases are due to the formation of a stricture in the ureter at an early stage in the disease, or to some congenital narrowing of the ureteral lumen. The result of either of these causes of obstruction is that an enormous dilatation of the pelvis and calyces takes place, as in ordinary hydronephrosis, but one always can see the tuberculous changes in the pelvis of the kidney and in the remaining parenchyma. Fig. 4 will illustrate this variety much better than any description.



Fig. 4.—Tuberculous hydronephrosis. Note the dilated calyces and renal pelvis. Caseous foci were to be seen on cortex on outer side of kidney. This case was complicated by a large perinephritic abscess.

The writer will not attempt to discuss the relation of gonorrhea further than to state that the gonococcus undoubtedly prepares the soil for invasion by the tubercle bacillus, and many cases are treated as long-standing gonorrheal complications, such as cystitis or epididymitis or prostatitis, when in reality their obstinacy to the ordinary treatment is due to secondary tuberculous infection. There is a last point in the pathology to which the writer wishes briefly to refer, and that is the relation between tuberculosis of the kidney and that of the male genitals.

It is now generally accepted that a primary focus in the epididymis can by the ascending (*i. e.*, lymphatic, urogenous, or mucosal continuity) route successively involve the bladder, prostate and kidneys, and, vice versa, the infection from the kidney may travel to the epididymis; or,

again, that foci may arise independently in the kidney or epididymis. Tuberculosis may originate in the bladder or prostate, but this is so rare that it may be considered a negligible factor. One thing is certain, and that is, if the kidney is involved as the result of ascending infection from the epididymis, the prognosis for ultimate cure is not good. The same is true if there has been simultaneous infection of the kidney and epididymis at about the same time.

SYMPTOMS AND DIAGNOSIS.

An earlier diagnosis must be made if we aim to improve our operative results. Rovsing, in a recent article, states that 40 of 200 patients suffering from tuberculosis of the kidney were sent to him too late for operation. Similar is the experience of the Mayo clinic, reported by Braasch. Of 71 cases deemed inoperable, nearly 50 per cent. had symptoms which had been present for over five years.

How can we make a diagnosis of tuberculosis of the kidney within the period in which removal of the kidney is able to check the disease? Unfortunately, we must make a bad start by saying that there is no other surgical condition of the kidney in which there are so few symptoms referable to the kidney itself, as is the case in tuberculosis of the organ. This is the chief reason why so many cases are overlooked. The writer will feel amply rewarded if he has succeeded in impressing one fact through the medium of this article, and that is that every case in which there are symptoms of pyelitis or cystitis, whose origin cannot be otherwise accounted for, must be regarded as suspicious of tuberculosis, until even this cause has been excluded. In other words, if the urinary sediment has been stained and examined and no organisms found by the ordinary staining methods, the case should be regarded as sufficiently suspicious to justify expert examination. This applies especially to cases of gonorrheal cystitis which are steadily growing worse after the employment of the accepted methods of treatment, or cases where the patient has either a clear or turbid urine, and is steadily losing weight, and the use of urinary antiseptics or bladder irrigations makes the condition worse. Finally, every case in which a young to middle-aged person, who has previously scarcely been conscious of the existence of a bladder, suddenly becomes aware of the fact that he is obliged to get up frequently at night and then urinates oftener during the day, and gradually notices that the act of urination is not only more frequent but is also quite painful, should be examined for tuberculosis of the kidney.

In a few words, the writer has tried to outline some of the more frequent clinical pictures. To enumerate more fully, we encounter the following classes of cases in the order of their frequency:—

1. Those in which the bladder symptoms predominate (these form the majority of cases), either with clear or turbid urine.
2. Those with vague pains over the kidney, pus in the urine, gradual loss of weight and strength.

3. Those with pus in the urine and marked rise of temperature (febrile mixed infection type). The writer will speak of this type a little more fully later.

4. Those with sudden initial hematuria (only a small proportion of cases show this).

5. Those presenting a renal tumor without any symptoms (closed tuberculous hydro- or pyonephrosis).

6. Those seen with evidences of a perinephritic abscess of unknown origin.

It would occupy too much space to describe each one of these clinical groups separately. At times one finds two or more combinations in the same patient. The method which the writer would suggest in making a diagnosis is to remember the above clinical pictures and then to see whether some of the following data are present:—

1. *Symptoms referable to the kidney itself.*—As a rule, there is little if any enlargement or tenderness; the only exceptions are those cases in which there is obstruction of the ureter (closed hydro- or pyonephrosis), or where there is rigidity and other local evidences of a perinephritic infection. It is rather exceptional to have pain in the kidney itself or the history of colicky pains along the ureter.

2. *Bladder symptoms.*—In the majority of cases these stand out prominently when we take the history. It is for this reason that the case is treated as cystitis and the true cause of the urinary symptoms remains unrecognized for such a long period. Urination is more frequent both by day and night, and becomes more painful as the bladder involvement increases.

3. *Urine.*—In some cases the urine is quite clear or contains only albumin, but the patient consults the physician on account of dull pain over the kidney, loss in weight and color, even before the bladder symptoms have been present.

These cases with clear urine are apt to occur when there is no communication between the diseased areas and the renal pelvis. Some of these cases are only diagnosed at operation, when the latter has been done for a tender and somewhat enlarged kidney. As a rule, the urine contains pus in variable quantity, without kidney elements, such as casts, etc. Blood in microscopic amount is found in many patients, but it is visible to the naked eye only in a small number. Some cases have, as their first symptom, a severe hematuria. If the centrifuged urinary sediment taken from a catheterized specimen has been stained and none of the customary organisms producing infection of the urinary tract found, one should proceed at once to search for tubercle bacilli. The best method in the writer's experience is that of Forssell—namely, to have the urine collected for twenty-four hours, then centrifuge the sediment and stain. Rovsing states that he has been able to find the organisms by this method in 80 per cent. of his cases. If the search for tubercle

bacilli has resulted negatively, a guinea-pig test is the most efficient, but requires at least ten days.

4. *Cystoscopic and ureteral catheterization findings.*—These two diagnostic aids are almost indispensable. There are cases in which the bladder changes are typical and again others in which the cystoscope does not give us any aid. In the typical cases there are characteristic small ulcerations round the ureteral orifice which lies so deep as to give rise to the so-called 'golf hole' appearance.

These are the cases in which a diagnosis can often be made from the cystoscopic examination alone. Unfortunately, one sees quite a number of patients in whom the bladder changes are not sufficiently characteristic to say that the cystitis is of a tuberculous nature. It is in this last-named group with a non-specific cystitis that the diagnosis is difficult. Even in such patients, however, our suspicion of the presence of some pathological condition is excited by the fact that the inflammatory changes in the mucous membrane of the bladder are most marked around one or both ureteral orifices. The intensely reddened and swollen area around the ureteral opening compels a search for further light on the nature of the process. This brings one to the question of whether or not the ureter should be catheterized. Some surgeons fear that there is danger of carrying the tuberculous infection to the healthy kidney by catheterizing its ureter, but the majority of operators feel that this fear is groundless. The information to be obtained in doubtful cases as to the nature of the infection, and whether only one or both kidneys are involved, as well as the reassurance we secure of the presence of a functioning opposite kidney, is so important that it outweighs any possible danger of catheterizing the non-affected ureter. The urine secured from each kidney should be examined for tubercle bacilli. In some patients one can only find the specific organisms in this manner. The tuberculous bladder is so irritable that cystoscopy and ureteral catheterization may be impossible without general anesthesia. The examination of the quantity and quality of the urine secreted by the non-affected kidney is at present considered of greater value in estimating its working capacity than any of the functional tests. The latter, especially the phenolsulphophthalein test, should not be omitted, however, but none of the functional tests can be considered as infallible. When catheterization of the ureters is impossible, the question arises, How can one determine whether both kidneys are involved? Rovsing and others advise a bilateral lumbar incision and examination of both kidneys, but the writer believes this is apt to lead one astray, and that it is better to expose both ureters so as to secure urine from each kidney. At times, the injection of indigo-carmin will enable one to find the ureteral orifices when they lie hidden in edematous or ulcerated mucous membrane.

Fever.—In the average case there is only a slight rise in the evening temperature. There are cases, however, where the tuberculous debris

cannot escape and is retained within the kidney, or where mixed infection is present. Under these circumstances fever of the intermittent (afebrile intervals followed by high temperature) or hectic (low morning and high evening) types of fever are found. Cases of mixed infection must be differentiated from the ordinary pyogenic, *i. e.*, non-tuberculous forms of kidney infection by stains and cultures.

X-Ray.—This is of little value until the destructive process has made great headway. The shadows which a so-called 'putty' kidney give are so characteristic as to be readily recognized by the experienced eye. These *x-ray* findings are present so late in the disease as to be of less value than the diagnostic features previously described.

Tuberculin Tests.—Aside from the von Pirquet and the subcutaneous tests, one can place no reliance upon any of the tuberculin tests or reactions, and no time should be wasted upon them.

Rectal and Vaginal Examination.—Some believe that a thickened ureter can be felt in the female through the vagina, but this is so seldom present as to be of little value.

The diagnosis must always be one of exclusion, and it is only by a careful examination of every case presenting the symptoms of subacute or chronic cystitis, as to its etiology, that we can hope to recognize the disease at an early stage.

TREATMENT.

Non-Operative (Medical).—Cases which are first seen when both kidneys are involved must necessarily be treated by hygienic and other non-operative measures, like tuberculin. Those who have had the opportunity of examining cases of unilateral tuberculosis of the kidney, treated by non-operative and operative measures, are unanimous in the belief that if we can demonstrate that only one kidney is involved, this is a positive indication for operation, since spontaneous recovery or cure after the use of tuberculin rarely occurs. The writer does not know of any better argument against the use of non-operative measures, especially tuberculin, than was shown recently by Wildbolz, of Berne. He treated 316 non-operative cases; 58 per cent. died within five years. The subjective symptoms continued with but slight remissions. Apparent cure occurred in a small number, but only lasted more than five years in 7 per cent. A true cure was observed only in one of the 316 cases. The experience of other reliable observers is similar. When we contrast with these figures the results obtained by removal of the kidney, we are compelled to recommend nephrectomy for every patient where tuberculosis is present only in one kidney.

Nephrectomy.—Aside from certain contraindications, this should be the method of choice. The presence of any one of the following conditions is a contraindication to nephrectomy: (a) If there is advanced tuberculosis elsewhere, especially in the lungs, peritoneum, or genitalia;

(b) if there is evidence of advanced involvement of the opposite kidney; (c) if the functional tests and examination of the urine obtained from the opposite (non-affected) kidney show that it is incapable of doing the work of both kidneys. Statistics of 1,023 nephrectomies for kidney tuberculosis, collected in 1911 by Israel, show that 75 per cent. were permanently cured. The causes of death after the first six months in the remaining 25 per cent. were pulmonary tuberculosis (45 per cent.), renal disease (36 per cent.), and acute miliary tuberculosis (18 per cent.). Of the deaths caused by renal disease, 70 per cent. were due to tuberculosis of the opposite kidney. This emphasizes the importance of making a diagnosis before the other kidney is involved.

The method of removal of the kidney differs but little from that ordinarily in use. Great care should be taken not to open any focus during the removal of the kidney. The only difference of opinion exists in regard to the extent of removal of the ureter and the treatment of the stump. Rovsing recommends the division of the ureter, about one inch below the kidney, with the cautery, and then sutures the distal end of the ureter into the skin close to the original line of incision. On the other hand, some believe that we fail to do a thorough operation without removing the entire ureter down to the bladder. Many surgeons inject pure carbolic acid into the stump. The writer has tried all these methods and believes the results obtained are about the same. The removal of the entire ureter is unnecessary and the danger of a fistula or of a retro-peritoneal infection is not less than when the ureter is severed high up. To suture the ureter into the skin is difficult and, in the writer's judgment, unnecessary. Equally satisfactory results are obtained by the injection of 30-40 minims of pure carbolic acid into the stump, and this method is much simpler than either of the other two. If a fistula persists, the use of the bismuth paste or tincture of iodine or tuberculin will usually effect healing within one to two years.

The post-operative treatment is of great importance. The patients should be placed under the best possible hygienic and climatic conditions, lest foci develop elsewhere. If there is coincident tuberculous disease in the epididymis, the prognosis is not as good, but both foci can be removed at the same sitting or one a short time after the other.

CLINICAL OBSERVATIONS OF CARBONIC ACID BRINE
BATHS ON THE CIRCULATION. -

By J. H. HONAN, M. D., of Bad-Nauheim, Germany.

The snap judgments and opinions on the action of carbonic acid brine baths are frequently projected into medical literature by men whom we should expect to be more conservative in their utterances on a subject to which they have given so little thought and study. We have now had three-fourths of a century of observation and study on the action of the carbonic acid baths as a therapeutic measure in cardio-vascular diseases, and in this time have gleaned some facts worthy of the careful attention of the medical profession. Many of these facts were obtained by clinical observations and were largely empirical deductions, with no attempt to explain the physiological action, the beneficial results observed seeming sufficient. Later, however, a number of physiologists took up the questions, and have now solved some of them on physiological grounds.

First among the laboratory workers on balneotherapy is Prof. Mueller¹ of the Tuebingen University. Profs. Laqueur² and Brieger,³ of Berlin, have made extensive and valuable clinical observations, as have also Strassburger⁴ and Solmsen.⁵ The unqualified statements which have several times appeared in print that "each CO₂ bath is equal to walking one mile," that "CO₂ baths overtax the heart," etc., are entirely contrary to the investigations of all these observers, and certainly absolutely contrary to the writer's own clinical observations and experience.

A matter which has been often entirely overlooked is that it is not the strength of the brine, nor the carbonic acid of the usual bath which is an active agent in exerting or taxing the heart, but the *temperature* of the bath, and, it is hardly necessary to add, the duration of the same. Anyone who doubts this should make a few tests with fresh water baths, noting the variation of effect on the subject with the variations of temperature above and below the neutral zone, followed by like tests with the carbonic acid brine baths. It is only in this way that some physicians will be convinced of the part which temperature plays, and see for themselves that it is the thermal effect of heat or the opposite influence of cold in the bath which may make it equal to "a severe gymnastic exercise." It should be borne in mind that the *Indifferenz Punkt* or neutral zone of temperature in the plain water bath is not the same as that of the carbonic acid bath, being in the former about 33° C., while in the CO₂ baths it varies from 32 to 34° C.

Innumerable tests, extending to thousands, prove that where the temperature is reduced below the neutral zone, there is a relatively proportional rise in the arterial tension, interpreted to mean an increased endovascular pressure or hyperpiesis. The temperature effect of cold on the vasomotors acts as a stimulant to the vasoconstrictors, causing a hypertonus of the arterial walls, which lose their natural resiliency and become less compressible, hence showing a higher blood-pressure reading. This effect is only obtained when the temperature is reduced *below* the neutral zone. In a large number of cases examined before the bath, in the bath, and after the bath, the writer found that reducing the temperature to 30° C., the systolic pressure rose 2 to 3 mm. Hg., the variation evidently due to the condition of the blood-pressure before the bath, patients with a normal or subnormal blood-pressure being much more sensitive to the temperature effect, particularly patients with a subnormal endovascular pressure. The increased pressure in patients with a normal or hyperpiesis lasted but a short time, from half an hour to two hours, then gradually descended below where it was before the bath, eventually rising again slowly to the point noted before the bath was begun, while the pulse was slowed and the ventricular systole was more nearly normal.

The saline carbonic acid baths produce a mechanical and chemical irritation of the skin which generates a sense of heat, neutralizing the cold of the water to a certain extent. These baths can, therefore, be given cooler, with less intensity of temperature-action, admitting of a wider range of the neutral zone of temperature. To study the real physiological action of the saline carbonic acid bath, we must confine our considerations to the neutral zone of temperature, eliminating absolutely the temperature action of heat or cold. There are two constant and almost invariable actions of these baths—namely, the hyperemia of the skin and the increased pulse-volume; closely associated with, but perhaps not quite so constant is the increase pulse amplitude, brought about by decreasing the diastolic or pulse-pressure and reduction of pulse frequency. The chemical action on the nerve ends of the skin by the gas bubble and the mechanical irritation of salts produce a very active dilatation of the capillaries. The hyperemia of the skin lessens the peripheral resistance and increases the peripheral blood-space, taking an immense load off the weakened or overburdened heart. It is apparently the stimulation to the sympathetic nerves and the vagi which improves the ventricular systole, evidenced by the slowing of the individual beat and the increased pulse-volume, as recorded by the tachogram and by a large number of sphygmograms before the bath and during the bath. The writer finds the slowing of the pulse is indicated in the tracing by the lengthened diastole. The increase in the compensatory pause, he believes to be most important in the restoration of the reserve force of the myocardium. This lengthened compensatory pause is the best evidence in his opinion that the CO₂ baths do not add extra work for the heart; but,

on the contrary, relieve that organ of much of its work by improving the conditions under which it must perform that work.

The investigations of Mueller and Veiel⁶ are the most valuable additions to the balneological literature that have appeared in recent years. Their observations are extensive and thorough and made from purely scientific interest.

All baths have in common three methods of acting on the human body—by chemical, mechanical, and thermal excitation. The chemical action on the nerve endings of the skin, though not clearly understood, is, nevertheless, evident in the physiological results obtained. Most authorities accredit the increased osmotic action observed in this treatment directly to the chemical action. The absorption during immersion has, no doubt, an influence on the deeper breathing of the patient observed during the bath and after the bath, to which the writer attributes largely the increased osmotic action or glandular activity, which is one of the most constant effects derived from the carbonic acid bath.

The mechanical irritation in the CO₂ brine bath is a very important action. Here the writer wishes to call attention to a growing tendency, on the part of writers on this subject, to credit the carbonic acid alone with this action; this is a mistake, as anyone may testify who has himself taken the bath known as the *Thermalbad* or has seen a patient in one. The *Thermalbad* has no free carbonic acid and is not rich in fixed carbonates. The hyperemia of the skin, obtained in this bath, is due to the mineral salts, chief of which is the calcium chloride. The minerals in these baths must not be overlooked, as they play a very important rôle in the physiological action of hyperemia, the most constant of all the actions obtained. The hyperemia is due to the irritation of the skin by the contact of the minerals causing a dilatation of the capillaries. This action is entirely local, as the writer has tested on a number of cases by keeping one arm of the patient above the water during the bath, while taking his polygraphic and blood-pressure readings, being careful that the temperature of the room was the same as the water in which the patient was immersed. The arm not exposed to the minerals showed no hyperemia in contrast to marked hyperemia of all that part of the body immersed in the water. Laqueur emphasizes the importance of salts in the physiological action obtained by these baths. Solmsen noted as much hyperemia in the *Thermalbad* as in the *Sprudelbad*—the effervescent carbonic acid bath.

The temperature action, the variation from the neutral zone, in the treatment by CO₂ baths, is rarely employed; and, when called into requisition in these baths, increases the duration of the intensity without increasing the intensity. For example, in a carbonic acid bath of 28° C., the temperature effect of cold would be no more intense than in a plain water bath of the same degree, but the temperature effect of cold would last longer than with the plain water bath. The great majority of baths

ought to be prescribed from 34 down to 30° C. Why should this be done? First, a temperature of above 34° C. tends to drive off the CO₂, lessening the quantity retained in the water for activity. Secondly, at this temperature, there is less contrast between the gas in the bubble on the skin and the particle of water touching the skin between the bubbles; in other words, such temperature neutralizes the activity of the carbonic acid gas. In the brine baths, with or without free carbonic acid, regardless of temperatures, there is a reddening of the skin. Below the neutral zone, though a reddening takes place, it is the very superficial capillaries which are dilated, as we know the arterioles are under the same vaso-motor influence, as are the larger arteries—brachial, radial, etc., and in these there is a constriction as is indicated by the increased blood-pressure and decreased pulse wave. The reciprocal relations between arterial volume and blood-pressure found in the normal subject is somewhat modified in the patient suffering from cardiovascular troubles. Patients with hypertrophied arterial walls, particularly where such hypertrophy extends to the myocardium, do not show the marked reaction that those do who have not such hypertrophy. Patients who have a hypertonus, where not of too long standing, usually show an exaggerated reaction, which in some cases is quite remarkable. Again, in patients with toneless arterial walls, there is often found an exaggerated reaction where the temperature effect of cold is added to the carbonic acid brine bath. In studying the accompanying table, it will be found, for this reason, that the writer's clinical deductions do not tally with many of the German laboratory results,⁶ his observations having been on patients with more or less disturbance of the circulatory function, while many of the laboratory observations have been on normal subjects.

Beginning with the neutral zone of temperature from 32 to 34° C., the temperature action may be studied above and below these points. At 32 to 30° C. there is, in some cases, only a slight indication of increased blood-pressure. Continuing the reduction in temperature, we find the maximum activity is reached at 26 to 27° C., with an immersion of eight to sixteen minutes. In 3 cases with subnormal endovascular pressure during the past summer, the writer has noted an increase in blood-pressure of 22 to 30 mm. Hg. Naturally, where there is a flaccid, toneless arterial wall, with a very low blood-pressure reading, the greatest rise in blood-pressure is obtained with *cold* carbonic acid baths.

Mueller,⁷ Strassburger,⁸ Weber,⁹ Brieger¹⁰ all agree in the physiological action of heat above the neutral zone. It is a well-established fact that the thermal action of heat begins at about 35° C. At this point is noticed a dilatation of the capillaries, an increase in pulse frequency, a reduction of the blood-pressure which is usually in ratio to the height of the endovascular pressure present before the bath. The maximum physiological action of heat is reached at 40° C., and if the bath be given hotter, a counter-reaction sets in and the blood-pressure increases, instead of decreasing.

The effect of carbonic acid bath on hyperpiesis is usually good when the pathological conditions present are understood; and in view of the same the baths are prescribed and administered as to time, temperature, duration, frequency, the effects being closely watched and modified to suit the conditions.

An author¹¹ has recently said that arteries never get too stiff to react under the proper stimulation. The writer has found this is true with a number of patients, apparently in the advanced stage of arteriosclerosis, all with high blood-pressure, hardened radials and temporals, who have reacted with CO₂ baths and received more or less benefit. One of these cases the writer reported two years ago. Mrs. F. M., widow of a General, mother of five healthy children. This patient, sixty-eight years old, has now been under the writer's care three years, and though the blood-

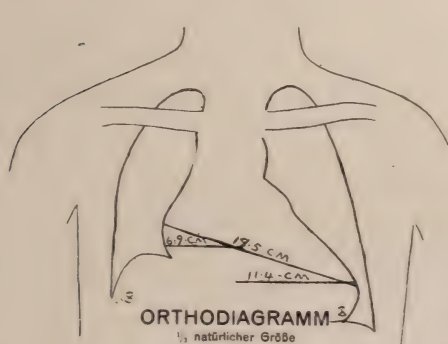


Fig. 1.

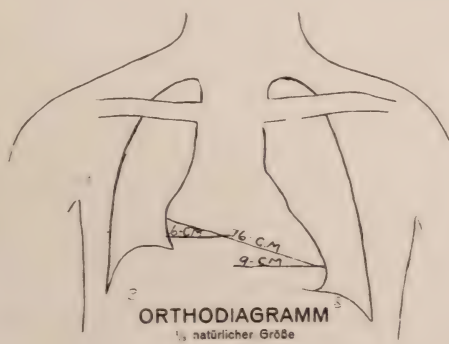


Fig. 2.

Fig. 1.—Orthodiagram, Mrs. F. M., taken August 10th, 1910, one year after first course of baths. Three years ago the writer's first examination revealed a hypertrophied heart with dilatation of left ventricle and right auricle, the liver engorged, enlarged and sensitive, pulsating peritibial edema, and marked dyspnea.

Fig. 2.—Orthodiagram, Mrs. F. M., taken August 7th, 1912. The longitudinal measurements show a reduction of $3\frac{1}{2}$ cm. which practically represents the amount of dilatation present when the first orthodiagram was taken.

pressure still remains relatively high, the improvement is marked. The liver is reduced in size with no pulsation, bowels regular, and she now walks with comfort. The stasis and dilatation on the right side have almost entirely disappeared. This patient shows marked general improvement with each year's treatment, in spite of the fact that her endovascular pressure remains from 176 to 190, and the baths given from 32 to 35° C. have had little influence in reducing this pressure.

Dr. O., an American physician retired, sixty-two years of age, blood-pressure 184 mm. Hg., engorgement of the liver and stasis of right heart, with a mitral murmur, systolic in time. The CO₂ baths relieved this patient very markedly, though the blood-pressure never reduced below 180 mm. Hg.

Mrs. N., *et. sixty-three*, widow, mother of four children, all died in

early life. Wassermann reaction negative. A New York colleague who happened to be at the writer's office when he took this patient's blood-pressure, which was found to be 270 mm. Hg., seemed surprised at his ordering baths for a patient with advanced arteriosclerosis. A five weeks' course of treatment with this patient again verified the statement of Romberg¹² that arteriosclerosis is no contraindication to CO₂ bath treatment. The blood-pressure, in this case, was gradually reduced, only 30 mm. Hg., yet the patient was much improved and declared she felt better than she had for ten years.

The writer has here given a summary of these 3 cases of hyperpiesis to show what he has long believed: That reduction in blood-pressure is no indication of general improvement; indeed there are many cases where a reduction would be nearly impossible, and in certain cases a marked reduction would be attended with very great danger. It is usual to attribute the slowing of the heart and the changed pulse-volume to the baths being administered below the neutral zone of temperature. While this is true, it is also a fact that the same effect is obtained from baths given within the neutral zone of temperature, the difference being only in degree of intensity. As the bath temperature is lowered, the blood-pressure rises in a fairly definite ratio, until a certain degree is reached, this degree depending, probably, on the sensitiveness of the vasoconstrictors and the resiliency in the arterial walls. This is the invariable action of the carbonic acid brine bath with a temperature of 30° C. or lower. At or below this temperature there is a constriction of the arterial lumen, an increased blood-pressure, a slowing of the heart-beat, and diminished per minute volume of blood reaching the end organs. Mueller was the first to prove on the human body the 'law of antagonism' or, better, the law of equalization between the circulation of peripheral and splanchnic systems. He and others found when there is a constriction in the peripheral circulation, there occurs a compensatory dilatation in the splanchnic system. A very great majority of patients coming under treatment of the carbonic acid saline baths are persons suffering from circulatory disturbances in some form, most of whom already have an engorged splanchnic system. It is bad therapeutics to apply, in such form, a treatment which tends to aggravate a pathological condition already existing. To increase the engorgement in the splanchnic system, when the patient is already suffering from stasis in the abdominal viscera, is a dangerous procedure, one which should be studiously avoided. For this reason it is very seldom that the carbonic acid saline bath should be administered below the neutral zone of temperature and only in selected cases, the indications for which are first, the evidences of sufficient reserve force in the myocardium to respond to an increased activity; secondly, a subnormal blood-pressure; indeed, any marked increase in the endovascular pressure is a contraindication to the administration of a cold bath. Thirdly, manifestations indicating lack of tonic

in the cardiac function when there is still evidence of remaining working force in the myocardium. Fourthly, a flaccid condition of the arterial walls, due to lack of tonicity in the wall tissues or faulty activity of the vasomotors. A clinical study of the physiological action of the carbonic acid bath shows a satisfactory response in all the aforementioned manifestations with the temperature at 30 to 33° C. However, if a more prompt action be deemed advisable, the temperature may under these conditions be lower. The writer's clinical observations, extending over five years on a large number of patients, convince him that additional work on the heart begins in the ordinary CO₂ bath only when the temperature is reduced to 30° C. or lower.

The *Uebung und Schonung* observed by Strassburger and his collaborators in the cool, *not cold*, carbonic acid brine bath, have been observed by many others since, and corroborate the writer's clinical observation that the cool bath, while adding work to the heart, so much improves the circulatory conditions under which the heart must work that the ultimate result is much more of a relief to the heart than added work.

In the writer's own practice, the number of baths given below 30° C. is very low. His colleagues, with whom he has discussed the matter, report a similar experience.

The saline carbonic acid bath should always be carefully regulated to meet the exact pathological conditions in the individual patient. If the embarrassment of the myocardial integrity has extended to the stage of exhausted reserve force, then baths, as other therapeutic measures, are useless. The baths may be administered under such a wide range of cardiovascular conditions that enthusiasts recommend them when almost every vestige of myocardial integrity has been destroyed. This is a mistake, as anyone with ordinary judgment can see. There must be sufficient integrity in the myocardial tissue and in the vascular tissue to respond, otherwise improvement is impossible.

The fineness of gradation, with which the carbonic acid brine baths may be administered, is a most important factor in the physiological action obtained. The great importance of these gradations can only be realized at the side of the bath-tub, by long and careful observations of patients during immersion. By a study of a number of patients in the bath, the physician learns the importance of the size of the bath, whether half-bath, three-fourths bath, or a full bath be indicated. One pulse will show the physiological action of the bath in two minutes, another in three, another in five, etc. The pulse will remain slowed in one patient six minutes, then gradually increase in frequency; in another, eight minutes, while in still another it will be ten minutes before a gradual increase in frequency begins. These are significant indications, from which conclusions cannot be drawn by observing one, two or three patients, and requiring assiduous studies on numbers of patients and over long

periods of time. The study of the same patients in the bath, from year to year, under changed conditions—many improved, some otherwise—is most valuable in arriving at the true physiological effect of the carbonic acid saline baths. The difference of opinion existing among observers as regards the question of whether the saline carbonic acid bath is added work to the heart or a relief, is largely one of temperature, the bald statement, that carbonic acid baths add extra labor to the heart, being entirely too indefinite. There seems to be sufficient evidence of the physiological action of the carbonic acid saline bath to show that the bath, at the neutral zone of temperature up to 40° C., acts as a positive relief to the weakened or overburdened heart.

A condition in which the carbonic acid baths are most valuable is found in that large class of patients who have a persistent abnormally high blood-pressure which has a tendency to constant increase. These cases consist chiefly of the brain-workers, in many of whom there is no indication of further heart, blood-vessel, or kidney disturbances. In these cases, drugs have little or at best but a transient effect, and are usually employed only in emergency. The carbonic acid bath in these cases is the most reliable therapeutic measure which can be employed. Where properly given, the baths are well borne and devoid of danger, and the percentage of improvement very large. Most persons with high blood-pressure suffer from engorged viscera, constipation or indigestion in some form.

High blood-pressure with kidney complications is often compensatory, and should be regarded as such in regulating the treatment.

Studies in blood-pressure have become of the most practical value in the diagnosis of cardiovascular renal diseases. There are many surprises and some anomalies that tax the clinician in his study of these conditions. The writer has for the past four years used the Uskoff sphygmotonomograph with the greatest satisfaction, giving as it does a complete picture of the heart's action, recording the blood-pressure, the jugular tracing, the brachial pulse, and the one-fifth second time-marking. If interstitial nephritis is coexistent with high blood-pressure, it is unadvisable to attempt a marked reduction of the blood-pressure. Indeed, if the kidney complication be of a chronic nature, a reduction of the blood-pressure is decidedly contraindicated.¹³ In such conditions it is the writer's practice to increase the elimination by the careful regulation of the CO₂ baths and the exhibition of the saline waters. When the subjective symptoms are distressingly prominent, a sufficient reduction to relieve the tension is followed by the happiest results. The writer has often found the headache, vertigo and giddiness to disappear after a few baths when the blood-pressure was not reduced more than 8 to 16 mm. Hg. In a number of cases he has seen the distressing subjective symptoms of hypertension disappear after five to six baths, with no change whatever in the manometer readings. He finds the age of the patient

has much to do with the results and in the interpretation of the results. As a rule, older patients are slower to respond to the bath treatment; and, though their subjective symptoms may disappear, they are much more apt to retain their high blood-pressure. This, no doubt, is due to the permanent thickening of the arterial walls and the greater difficulty in arresting tissue change after middle age.

There is a class of patients, with a subnormal blood-pressure, suffering from debility of the vascular system, the walls of whose vessels are soft and absolutely toneless, easily compressible, consequently showing a very low blood-pressure reading. In the effort to maintain the functions of the organs, the heart is found working hard, beating rapidly; indeed, so rapidly that the systolic contraction is often incomplete, with an evident loss of much of its functional force. The great majority of these patients are young people in early adolescence, some anemic and all suffering from malnutrition. Most of these patients have been treated with caffeine, quinine, ergot, strychnine and other drugs with little or no results. Drug therapy in these cases is almost entirely worthless or contraindicated. The results obtained with the CO₂ baths are often remarkable. Usually the temperature of the CO₂ baths in these cases is reduced to 30°-29° or even 28° C., and during the immersion in the baths the writer has frequently observed a slowing of the pulse to 12-16-18 beats per minute. Some of these subnormal blood-pressure cases are most interesting. One which is typical came under the writer's care two years ago.

E. X., a young man, referred by his family physician in Boston. The patient was nineteen years old, tall, slender, rather undernourished and anemic. The orthodiagram showed a drop heart, its longitudinal axis being vertical, the organ rather small. In the second, third, and fourth examinations by the Uskoff sphygmotonomograph, the writer found the blood-pressure ranging from 110 to 114, the arterial walls flaccid, easily compressible, the diastolic pressure 36 and 44 mm. Hg. The delay in response to treatment in this case was at first discouraging. It was not until the course of treatment was half finished that any improvement was noticed. Then there began a gradual increase in blood-pressure, until at the end of the treatment he registered, on repeated examinations, 132 to 140 mm. Hg. systolic pressure, with a marked general improvement. This patient had been treated with strychnine, digitalis, atropine, in an effort to maintain normal endovascular pressure, without results. The increased blood-supply to the vasomotor centre is apparently due to the more normal function of the heart, and is followed by the increased action of the vasoconstrictors. In restoring and maintaining the vasomotor equilibrium, there is added to the arterial function, a factor which is most important in maintaining normal endovascular pressure. In maintaining the normal pressure, the normal vigor in the ar-

terial walls is established, and, indeed, in the writer's opinion, creates a physiological compensatory hypertrophy of the walls, which in turn induces a more vigorous and normal action of the heart, thus transforming a vicious circle into a beneficial cycle of events in the circulatory function. An important point in the treatment of these cases, with hypotension due to flaccid arterial walls, is the diastolic or mean pulse pressure. This pressure should be the guide, as it almost alone indicates the force in the arterial muscular mechanism.¹⁴ In the writer's observations he made allowance, for postural variations, by taking, before the bath, a sphygmotonomograph record, the patient first in the recumbent position, then in the standing posture. The influence which the carbonic acid baths exerts on the vasomotor system and the improvement noted in most of these cases by treatment with the baths convince the writer that the splanchnic system of nerves is largely at fault in causing visceroptosis. The increased urinary output, the increased bowel movement, and the subjective feeling of lightness, invariably noted as a result of this treatment, point unmistakably to a relieved splanchnic engorgement and increased elimination of toxins.

The writer is fully aware that much of the scepticism, now existing regarding the CO₂ baths, is due to the wildly exaggerated statements made by over-enthusiasts; but, allowing that these utterances be taken with even two grains of salt, they should not obscure from the serious-minded the fact that good results are obtained in most cases of cardiovascular disease. Every physician should be sceptical to the point of wisdom, but should not allow such to grow to prejudice. It is a significant fact that of the great number of practitioners who visit the CO₂ spa every year, either themselves taking a course of treatment or studying for some weeks the effects on others, it is very seldom that one leaves unconvinced of their therapeutic value.

The circulatory balance is so exquisitely adjusted in the different organs that the slightest deviation of force or pressure in one organ may cause a relative circulatory change in all the others. In many instances the carbonic acid bath treatment has re-established the circulatory equilibrium, relieved an engorged liver or congested kidneys of all indications of disturbance, and re-established in these organs a relatively normal circulation. It is not the increased amount of blood which does most mischief in an engorged liver, but the inactivity of the hepatic cells generating a poison. Relieving this engorgement is a great aid in re-establishing a normal metabolic process; and this, the writer believes, to be accountable for the 'feeling of lightness' which most patients experience during, or after, a course of bath treatment.

There is no part of internal medicine in which such progress has been made in the past few years as in the methods of diagnosis of circulatory diseases. The instruments of precision have added an exactitude to our

diagnosis that is of inestimable value.¹⁵ There has been no corresponding progress in the treatment. Indeed, a glance at the current literature at home and abroad shows no added drug, to our armamentarium, of any decided value. On the contrary, our more accurate methods of observation, have shown the utter uselessness of some, and have restricted the use of others.

The principal functions of the carbonic acid brine bath are the influence exerted on the heart or circulatory mechanism, the elimination of poisons, the correcting of malnutrition or imperfect elimination, and the arresting of tissue change in the heart and vessels. In these actions the

TABLE.

Bath Temperature.	Blood-Pressure per mm. Hg.	Pulse, Frequency per Minute.	Pulse Volume.	Peripheral Capillaries and Arterioles.	Thermal Effect.	Heart Work.	Splanchnic System.
28 to 30°C.	Raised 20 to 30.	Reduced 12 to 22.	Decreased maximum.	Superficial dilated arterioles contracted.	Maximum cold.	Increased.	Compensatory dilatation.
30 to 32°C.	Slight rise 2 to 8.	Reduced 8 to 18.	Decreased slightly.	Dilated arterioles contracted.	Slight cold.	Passive.	Compensatory dilatation.
32 to 34°C.	May be slight rise or slight fall.	Reduced 2 to 8.	Very slight variation.	Dilated arterioles, passive.	Neutral.	Relieved.	Neutral.
34 to 36°C.	Fall 4 to 14.	Increased 4 to 10.	Increased.	Dilated.	Slight heat.	Relieved.	Compensatory contraction.
36 to 38°C.	Fall 16 to 40.	Increased 8 to 14.	Increased maximum.	Maximum dilatation.	Marked heat.	Relieved.	Compensatory contraction.
38 to 40°C.	Fall 20 to 60.	Increased 10 to 16.	Increased.	Maximum dilatation.	Maximum heat.	Relieved.	Compensatory contraction.

baths do not exhibit the evanescent effect of drugs, but render a more permanent change in the circulation.

There is a growing disposition among the conservative and thinking element of the medical profession to discredit the therapeutic value of drugs. This is particularly true in the use of drugs in cardiovascular diseases. These specifics have been dropping by the wayside, so that now there are but three or four that command any respect in cardiovascular diseases.¹⁶ Even digitalis, the old stand-by, one of the most abused or mis-used drugs in the pharmacopeia, has lost, in the past ten years, much of its

one-time popularity, and is now used only in a very restricted number of cardiovascular diseases.¹⁷

The most careful clinical and laboratory observations cast only doubt on the efficiency of the most reliable remedies; indeed, the time is here when the profession should know more of the efficacy of baths, diet, rest and exercise in the treatment of circulatory diseases, and should teach students the therapeutic value of these measures.

There has accumulated, as the result of scientific observations, a great amount of data, made by many different workers in hydrotherapy, concerning the physiological action of carbonic acid baths. These observations show that the baths have such a constant or unvaried physiological action as remove all doubt of their efficiency in heart and blood-vessel diseases from the minds of the most sceptical.

Baths, one of the oldest therapeutic measures in the history of medicine, have not received the proper study from the medical profession. Of recent years, however, their physiological action has had serious scientific thought. This is particularly true in Germany, where many university professors are devoting much time to such observations. There is now convincing proof that we have in baths a therapeutic measure of the highest value, one that admits of the finest gradation in application. In the intensity and constancy of their action on the heart and circulatory system, one soon learns to have a confidence that is unknown in drug therapy. The writer is convinced that we have in carbonic acid baths a therapeutic measure much more reliable in action than drugs, with a much broader field of application; a measure every physician should know much more about than is at present known; a measure offering hope in conditions where drugs are entirely useless or even harmful, often bringing about improvement where drugs have entirely failed.

CONCLUSIONS.

The physiological action of the carbonic acid saline bath on the circulatory system, particularly the increased glandular activity and increased elimination, is the best indication of its therapeutic value.

The fine gradation in the administration of these baths admits of their application in almost all forms of chronic cardiovascular diseases. The carbonic acid brine bath of neutral zone or warmer relieves the action of the heart. The cooler bath increases the action of the heart, but improves the conditions under which the heart performs its work. The cold bath adds extra work to the heart. The carbonic acid brine bath does *not* add extra work to the heart, unless administered below or above the neutral zone of temperature—below 30° C. or above 39° C.

High blood-pressure or sclerotic condition of the arteries is no contraindication to the balneological treatment. The subjective symptoms

of the individual patient, three or six months after the carbonic acid bath treatment, are the best proof of its action.

The blood-pressure readings, particularly in hyperpiesis, have almost no clinical relations to the general condition of the patient's improvement which is often marked in patients with only slight variation in blood-pressure. The writer has never met a case in which the arteries would not show some reaction to the proper stimulus. Five patients with a blood-pressure reading of 260, 268, 270, 270, and 278, all of whom took the full course of baths, received more or less benefit, the extent of benefit depending largely on whether the hyperpiesis was due to a sclerotic degeneration or that hypertonus was the prime factor in the high blood-pressure readings.

The great benefits to the circulatory system in changing the blood mass from the abdominal to the peripheral system is difficult to estimate. The baths dilate the peripheral capillaries and arterioles, as can be seen from the appended table, thus relieving the engorged viscera which are present in such a large percentage of cardiovascular patients.

The constancy of the action of the carbonic acid brine baths, the safety with which they may be administered, the reliability of their effect in recorded conditions, give one a confidence in them no drug or drugs can possibly inspire.

As a vasomotor and heart stimulant, few drugs can compare with carbonic acid baths, and no drug has the same constancy and uniformity of action with the same clinical results, in so many forms of cardiovascular disturbances. The great efficacy of the baths in this class of disturbances seems to be due to an improved condition of the sympathetic nervous system and a better vasomotor response.

BIBLIOGRAPHY.

- ¹ Mueller: The Effect of Baths and Douches on Blood-Pressure. (*Verhandlungen des XX Congresses fuer innere Medizin.*)
- ² Laqueur: The Practice of Hydrotherapy and Allied Methods.
- ³ Brieger: Hydrotherapy and Internal Medicine. (Sitzung 16 Sept., 1909 Congress innere Medizin Pharmakologie, Balneologie und Hydrotherapie.)
- ⁴ Strassburger (*Deutsch. Archiv fuer klin. Med.*, Bd. 82, 1905).
- ⁵ Solmsen: Experiences of a Patient at Nauheim. (*Zeitschr. fuer Balneologie*, No. 11, 1909.)
- ⁶ Mueller and Veiel: Contributions to the Physiology of Blood Circulation in Man, Especially to the Study of the Distribution of Blood. Studies of Water, Carbonic Acid and Oxygen Baths at Different Temperatures. (*Innere Medizin*, Nos. 194-196, 199-201.)
- ⁷ Mueller: The Sphygmotonograph and its Value in Practical Medicine. (*Med. Klin.*, Nos. 2-4, 1908.)
- ⁸ Strassburger: Einfuehrung in die Hydrotherapie und Thermotheapie. Jena. 1909.
- ⁹ Weber: Der Einfluss psychischer Vorgaenge auf den Koerper. Berlin. 1910.

- ¹⁰ Brieger and Krebs: Grundriss der Hydrotherapie. Berlin. 1909.
- ¹¹ Russell: Arterial Hypertonus, Sclerosis and Blood-Pressure. Edinburgh. 1907.
- ¹² Romberg: Krankheiten des Herzens und der Blutgefäesse. 1909.
- ¹³ Hasselbach: The Effect of the Chemical Light Bath on Respiration and Blood-Pressure. (*Skandinavisches Archiv fuer Physiologie*, Vol. XVII, Copenhagen, 1905.)
- ¹⁴ Broadbent: Heart Diseases. London. 1906.
- ¹⁵ Lewis: The Mechanism of the Heart-Beat. London. 1911.
- ¹⁶ Norris. Oration in Medicine. (*Journ. Med. Assoc. of New Jersey*, 1911.)
- ¹⁷ Mackenzie (*Heart*, London, 1911).

CEREBROSPINAL FLUID DIAGNOSTICS.

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In placing this subject before the reader, the writer does not wish to burden his time with the many finer details, points or findings that at the present time have merely an academic interest, or with the interesting history of the progress made in examinations of the cerebrospinal fluid. He believes it will suffice to discuss what may be considered the essential facts, and then correlate some points of a few diseases where the laboratory findings, now being discussed, are often of great value as aids in diagnosis. Again, the reader's attention is called to the fact that there are some features of rachiocentesis, well known and highly valued, that will not be considered in the discussion which the writer is attempting to make as practical as possible.

The detailed technique for obtaining the cerebrospinal fluid is not particularly pertinent to this essay. A number of different methods are described. The instruments collected or joint apparatus should embody three essentials: (1) Arrangement for controlling the flow, (2) means for obtaining the exact combined pressure at any stage of the operation, and (3) a method for collecting the fluid. Simplicity should be demanded in all features of the apparatus. The writer prefers to use the water-pressure gauge, which permits a ready sterilization by boiling or steam pressure for each operation. The amount of cerebrospinal fluid used in the gauge tube is of small consequence, and particularly so in the practical deduction in pathological cases. It is nearly always plus pressure with which we are dealing.

Can we promise the patient that there is no attendant danger from the withdrawal of cerebrospinal fluid, or that it is as simple as the introduction of a hypodermic needle? The writer answers, emphatically, no. Although he has had no deaths following more than 300 lumbar punctures during the past two years, yet he has a personal knowledge of several fatal cases in the hands of others, and the literature contains a record of quite a number. Two prominent medical periodicals have had editorials minimizing the simplicity and danger attending the operation, which statements were grossly misleading. It is true that the withdrawal of small quantities in the normal individual is devoid of all danger if a few proper precautions are observed. But we are always performing the operation upon subjects having actual or suspected pathological changes. And here the writer wishes to emphasize the necessity for

making an accurate neurological examination first, and arriving at a provisional diagnosis, or lining up all the differential possibilities.

The examination of the cerebrospinal fluid falls under three heads: physical, chemical and microscopical. Each of the three includes tests of much importance for arriving at accurate diagnostic conclusions in a large number of neurological diseases.

Physical.—The pressure of the cerebrospinal fluid in the lumbosacral cistern can often be roughly estimated by the rapidity of the flow. Using a needle of ordinary calibre, we should obtain from the normal individual 40 to 80 drops per minute. Very frequent drops or a continuous flow indicates a definite increase in the pressure, which always denotes a pathological condition of the encephalon or spinal cord, or their meninges. In the writer's series of cases there have been three dry punctures where he felt certain that there was no fluid in the lumbosacral cistern, of which two died and upon whom autopsies were made. One was in an infant with agenesis of the cerebral mantle and a hydrocephalus internus. The foramen Magendie and accessory foramina were obliterated in the deforming process. Thus no cerebrospinal fluid could gravitate from the ependyma, where at least 95 per cent. is secreted, to the spinal subarachnoidean space. The second autopsy was that of a young girl who had died from secondary cord suppression following acute poliomyelitis. There was a local circumferential thickening of the meninges at the seventh dorsal segment with adhesions preventing any fluid from gravitating downward. The writer has had a few cases where the pressure was high, but the flow of fluid slow. A spinal nerve root may float in front of the lumen of the needle and produce a diminished flow or even complete cessation. Ordinarily, the writer measures the pressure at the beginning and end of the operation. Usually, a decided decrease in pressure occurs after withdrawing 15 to 30 c.cm. of cerebrospinal fluid. The writer considers any pressure above 160 mm. as decidedly abnormal, and 160 to 120 as an indeterminate pathological range. His group of 43 cases of neurological syphilis in which he was permitted to do lumbar puncture includes 19 cases of brain syphilis, tertiary and secondary, 8 myelitis, 7 paresis, 6 tabes, 2 meningeal, and 1 neuritis. A couple of these cases had a low pressure, and the syphilitic diagnoses were made by undoubted positive clinical and laboratory findings. However, the vast majority of the neurological syphilitics, including meta-, tertiary, and secondary types, will give an increased hydrostatic and elastic pressure of the cerebrospinal fluid. The pressure and amount of fluid present has much value as a diagnostic aid to the trained neurologist, but to the general practitioner is probably less significant as a means of differentiating the various types of neural syphilis. Quincke, the originator of lumbar puncture technique and nestor of scientific cerebrospinal fluid work, tells us that the normal pressure in man ranges from 40 to 130 mm. water; that 150 mm. is the maximum limit, and that 200 must always be regarded as

abnormal. The pressure is increased in nearly all acute and chronic inflammatory states of the central nervous system. In hydrocephalus and especially in brain tumors, the pressure increases enormously. The writer's case giving the highest pressure was a brain tumor, a glioma, extending from the corpora quadrigemina to the right occipital cortex. It measured something more than 560 mm. water, the tubes at hand not being long enough to measure beyond the figure given.

Cerebrospinal fluid from a normal case is always clear and limpid. The fluid is cloudy in acute meningitis whether due to the diplococcus intracellularis meningitidis, pneumococcus, staphylococcus or other pus-producing organisms. The writer has had one case of slightly cloudy

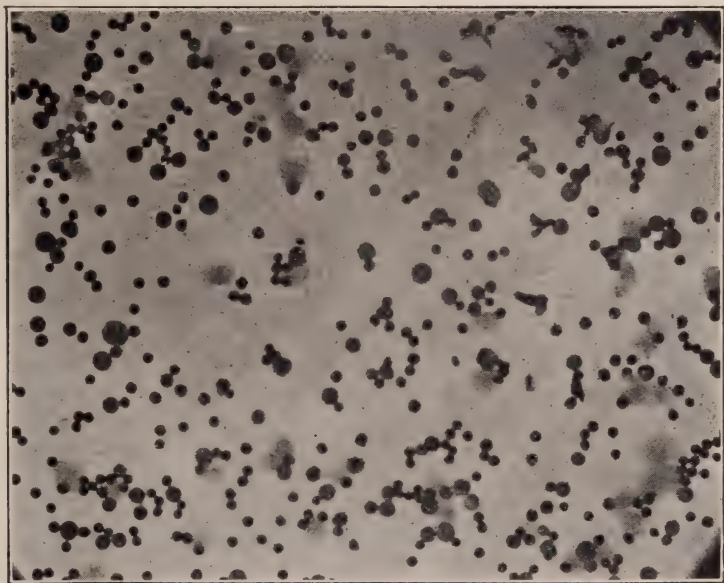


Fig. 1. G. B. Microphotograph. B. and L. $\frac{1}{4}$ Obj. of cerebrospinal fluid. Wright's stain. Extraordinary pleocytosis in a case of syphilitic meningitis. 1,230 lymphocytes per cubic millimetre.

fluid where the meningitis was caused by the *B. coli communis*. The patient recovered. In a few exceptional instances of epidemic meningitis, organisms have been found in fluid appearing clear. In tubercular meningitis the fluid is often clear. It may contain flocculi which also are present quite frequently in several chronic meningeal disturbances. The fluid often becomes slightly opalescent in the preparalytic stage of acute poliomyelitis. It clears at the onset of the paralytic stage.

Where blood appears we must rule out lesions produced by the puncture operation. Blood may appear in the fluid in cases of cranial and spinal column trauma, and in apoplexies and hemorrhages within a neoplasm with rupture into a ventricle or subarachnoidean space. Xantho-

cromia may be present where there has been an ancient hemorrhage or transudate. In one of the writer's autopsic cases of brain tumor—a glioma—cerebrospinal fluid removed nine days before death had quite a yellow color caused by washed-out red corpuscles and hemosiderin appearing from hemorrhagic points in the tumor which had a portion of its surface directly lining one lateral ventricle.

Chemical.—Normal cerebrospinal fluids contain a certain small amount of albumin, considerably more being present in that from the lumbosacral cistern as compared with that in the ventricles. Its increase in certain inflammatory states is not of great diagnostic value.

There is a mere trace of globulin in the normal fluid. In syphilis of the central nervous system it becomes greatly augmented, and the quantity

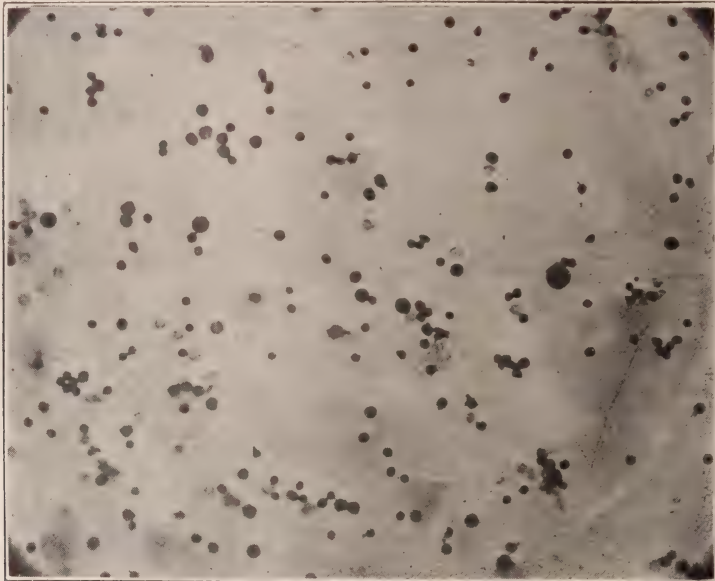


Fig. 2. Same case and technique as in Fig. 1. Cerebrospinal fluid removed ten days later. Patient improved.

is of some value as an indication of the severity of activity of the disease process in the meninges or ependyma. The writer has used both the Nonne-Apelt ammonium sulphate test and the Noguchi butyric acid test, and has come to prefer the latter which he believes to be more certain and delicate. He considers a positive globulin test as highly indicative of neural syphilis. However, he is mindful of the fact that definitely positive reactions may be obtained in nervous diseases not syphilitic. He has obtained a positive test in a few acute poliomyelitis fluids and one vigorous positive reaction in a cerebral glioma case. The patient's blood-serum and cerebrospinal fluid also gave a positive Wassermann reaction.

The Wassermann test may be made on the cerebrospinal fluid as well as on the blood-serum. The writer has had a few cases of undoubted neural syphilis with reports of a positive Wassermann test on the blood-serum and negative for the cerebrospinal fluid. But more frequently has he had negative Wassermann reactions on serum and positive on fluid, and obtained lymphocytosis and greatly increased globulin in the cerebrospinal fluid. All these cases had a clinical history of syphilis.

The writer believes that in neurological cases the Wassermann test should be made with the cerebrospinal fluid rather than with the blood-serum alone, or with both. In a few recent cases he has had positive luetin reactions also.

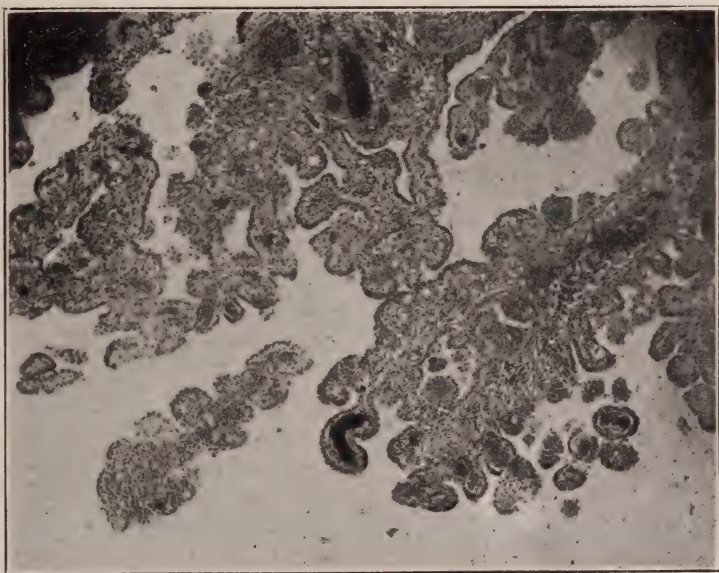


Fig. 3. P. F. Microphotograph. B. and L. $\frac{1}{4}$ Obj. Iron-hematoxylin-Van Gieson stain. Choroid plexus of lateral ventricle from a case of cerebral syphilis. Infiltrated areas. Some ependyma cells destroyed and some degenerated. Many normal cells seen. Rachiocentesis before death showed a diminished quantity of cerebrospinal fluid with greatly decreased pressure but high pleocytosis.

There is a reducing substance in the normal cerebrospinal fluid. In acute meningitis this substance is absent or much decreased, as evidenced by the Fehling test. There is the normal amount of glucose in chronic meningitis cases. The diminution of the reducing substance seems to bear a relationship to the increase in the number of polynuclear cells. During recovery it reappears at the time when the polynuclear cells have become few in number.

Microscopical.—The microscopical examination of the cerebrospinal fluid furnishes us with information no less appreciated than that from

the physical and chemical. Purulent, turbid or opalescent fluid means a great increase in the cellular content, but many a perfectly clear fluid has revealed by the microscope a marked pleocytosis. Erythrocytes in the fluid have been adequately considered.

The normal cerebrospinal fluid contains very few leucocytes, almost exclusively lymphocytes, the number probably never exceeding 5 or 6 per cubic millimetre. There should not be more than 2 or 3 cells in the entire chamber of a Thoma-Zeiss blood-counting chamber. In acute meningitis, including that caused by diplococcus meningitidis, pneumococcus, staphylococcus, influenza bacillus, coli communis and similar organisms, the leucocytes are chiefly polynuclears. There are a few exceptions. The writer has seen 2 cases of epidemic meningitis with most

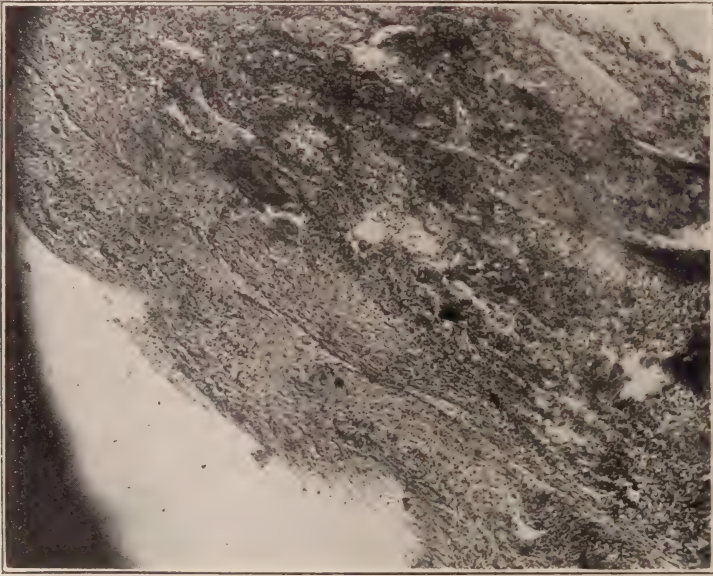


Fig. 4. Same as Fig. 3, excepting in a different region of the choroid plexus where is shown a complete destruction of all the ependyma cells. Marked infiltration. Connective-tissue replacement.

of the cells lymphocytes. Netter reports a case where the cells were numerous and all lymphocytes. In acute poliomyelitis there is an early mild increase in the lymphocytes. This lymphocytosis probably always precedes the paralytic symptoms by a number of hours or several days. This has been demonstrated in the experimental monkeys in the research work at the Rockefeller Institute. In a tubercular meningitis where the fluid may be clear or turbid, the cells are usually greatly increased; also very largely the lymphocytes. In all forms of syphilis of the central nervous system there is a pleocytosis, almost exclusively with the lymphocytes. The cells in the more active secondary cases have a greater range of variation in size. Some writers have attempted to use the

lymphocyte count as a means of differentiating *tabes dorsalis* from general paresis. This cannot be done in every instance; but in general paresis a characteristic cell type—plasma cells—is frequently found. The writer's highest recorded pleocytosis in the syphilitic group was in a secondary lues of the meningitic type (Figs. 1 and 2). The initial lesion, a lip chancre, appeared less than three months before the writer's two lumbar punctures were made ten days apart. Both punctures gave a decidedly turbid fluid on account of the high lymphocyte count, the first more cloudy than the second. The cells were entirely lymphocytes and possessed wide variation in size. They stained deeply and with regular outlines. No plasma cells present. The fluid from the first puncture gave a lymphocyte count of 1,230 per cubic millimetre, and from the second 790. The patient recovered. Flocculi are present in many of the chronic neural disorders, and at times where little or no pleocytosis exists.

The increased cell count may be determined in several ways. The most accurate means at our command is the Fuchs-Rosenthal counting chamber. With this apparatus the fluid is mixed with a coloring solution, and the cells are counted very much as in the use of the Thoma-Zeiss counting chamber in blood work. Since the counting space in the Fuchs-Rosenthal slide has ten times the capacity of that in the Thoma-Zeiss slide, it should be much more accurate for fluids with a low cell count. The writer has often used the Thoma-Zeiss counting chamber with success. Having had sufficient experience, one need not stain the cerebrospinal fluid. The cells can be very roughly estimated by placing a drop or two of either the uncentrifuged or centrifuged fluid on an ordinary glass slide, cover and examine with higher power. Stained smears from the centrifuged specimens may be used. The latter methods for estimating the number of cells are subject to gross possible errors, even when considerable experience has been acquired.

The literature contains a few reports of cells from neoplasms having been found in the cerebrospinal fluid. Obviously, tumor cells can be present only in cases where the new growth has extended to the surface, and where, during a degenerating process, they freely separate in exceedingly small particles or as individual cells.

It is to-day hardly necessary to lend our voice to the spreading of knowledge concerning the importance of bacteriological examinations of the cerebrospinal fluid. First in importance comes the search for the *diplococcus intracellularis* in suspected acute meningitis cases. It should not be forgotten that many cases have few or no intracellular organisms. It is maintained by some that, where many of the diplococci are within the polymorphonuclear cells, the prognosis is better. These investigators believe that the phagocytic properties are more in evidence and that the patient is showing better resisting qualities. The number of diplococci in fluid from each successive puncture, in a rough way, may be used to estimate the decrease or increase of the pathological process. Thus the

dosage of the meningitis serum may be diminished or augmented. The pneumococcus is perhaps the second most frequent organism in the fluid from acute meningitis cases. It is at times found mixed with Weichselbaum's diplococcus. The influenza bacillus, typhoid, pneumobacillus, staphylococcus, and streptococcus are less frequently found in acute meningitis fluids. The tubercle bacillus, first found in the cerebrospinal fluid by Lichtheim, is not always readily detected in the tubercular meningitis cases. Pfoundler divides tubercular meningitis into three stages, and states that the bacillus may be found in 33 per cent. of the fluids in the first—the stage of irritation; in 50 per cent. of the second—the stage of brain pressure; and in 100 per cent. of the third—the stage of paralysis. Fibrin and coagulation are present in nearly all the tubercular fluids, and the tubercle bacillus is usually more readily found in the fibrin meshes. Smears and most stains are readily made of fluid uncentrifuged. Centrifuging makes the work easier in some cases. Where we wish to look for motility of organisms, we should examine the fluid promptly without staining. The writer has had one case of coli commune meningitis where he first suspected the organism in the fluid when withdrawn, and later corroborated by laboratory work.

CONCLUSIONS.

The diagnostic data resulting from careful cerebrospinal fluid examinations, in a number of neuropathological conditions, are of great importance in arriving at conclusions regarding proper therapy and prognosis. Cerebrospinal fluid diagnostics never supplant clinical diagnosis. All the accurate clinical neurological findings necessary should be at hand first, before rachiocentesis is attempted. Rachiocentesis is indicated in several diseases where its utilization is both for diagnosis and therapeutic measures at the same time.

TEMPORO-MAXILLARY ANKYLOSIS.

By D. W. BASHAM, M. D., of Wichita, Kansas.

In considering the subject of constriction of the jaw, this paper will be limited to those forms of the disease which depend upon changes in the temporo-maxillary articulation. Other forms of the malady where the immobility of the maxilla is due to cicatricial contraction following ulceration, sphacelation of the soft structures about the mouth, and to other causes will not be discussed.

Ankylosis of the temporo-maxillary articulation is practically always the result of arthritis. The arthritis in turn may generally be traced to some of the various infectious diseases. Arthritis sicca may be an exception to the rule. It is a fact that synarthrosis of the temporo-maxillary joint is sometimes caused by the dry form of arthritis. In such cases the mobility of the joint is prevented by the filling up of the glenoid cavity and the production of stalactiform exostoses and even loose bodies of bone in the joint cavity. Arthritis and peri-arthritis of the temporo-maxillary joint may be due to extension of an inflammation from the neighboring tissues. Otitis media, parotiditis, and osteitis affecting the body of the maxilla may cause an infection of the temporo-maxillary joint. According to Heydenreich in his article on "Diseases of the Temporo-Maxillary Articulation" in the "System of Surgery" by Duplay and Reclus, traumatic arthritis and gonorrheal arthritis constitute the most frequent causes of ankylosis. He cites 7 cases, observed by Fournier, of temporo-maxillary ankylosis due to Niserian infection. Traumatic arthritis seems to be somewhat frequent. In most cases the injury seems to have been caused by a fall upon the chin.

Complete ankylosis of the temporo-maxillary articulation is truly a very serious matter. In the pre-aseptic age of our art it was a far more serious condition to encounter than at present. The unfortunate patient was often obliged to take his nourishment through an aperture created by the extraction of one or two of the upper, and lower teeth. The evolution of the surgical treatment of the condition under consideration is an exceedingly interesting subject to study.

Many procedures were proposed by the older surgeons, which would appear crude and almost barbarous to the present age of surgical refinement. Some of these rude methods were actually put into practice. There were invented many different forms of wedges, screws, and levers with which to force the jaws apart. Heydenreich credits Burton with being the first to suggest the treatment of ankylosis by section of

the bone near the joint involved. According to the same authority, Carnochan, Diffenbach, and Richet proposed this method for the relief of temporo-maxillary ankylosis. Grube, according to the same historian, was among the first to section the condyle. He performed his operation with a chisel entered through the buccal cavity. In 1854 Humphrey, of Cambridge, divided the condyle through a cutaneous incision. Bottini, of Pavia, sectioned both condyles through a cutaneous incision. This was the popular operation for several decades. In 1880 Abbé, of New York, divided the condyles through a skin incision. With these methods injuries to the facial nerve were of frequent occurrence.

Ollier devised a T-shaped incision which enabled him to deviate the nerve from the field of operation. Koenig made use of an incision similar to that of Ollier. Kummer made his incision along the superior border of the zygoma with a supplementary descending limb in front of the ear. He recommended division of the arch of the zygoma temporarily as a means of better access to the joint. Esmarch conceived the idea of creating a pseudarthrosis in the ascending ramus of the inferior maxilla. The idea occurred to his mind after observing a case where the spontaneous elimination of a sequestrum was succeeded by the formation of a useful false joint. Heydenreich gives Helfreich the credit of being the first to interpose a piece of muscular tissue between the divided fragments of the condyle for the purpose of forming a false articulation. Rochet sectioned the ascending branches of the maxilla. Bennet excised both angles of the jaw with a good result. Heydenreich says Rizzoli's operation was similar to Esmarch's. Levrat divided the bone between the last molar teeth and the ascending ramus. Kraske advised preliminary tracheotomy to obviate the occurrence of suffocation in the event of vomiting during the anesthetic.

These historical facts have been noted for the purpose of showing the manner in which surgery of the temporo-maxillary ankylosis has been developed.

The article by Lilienthal* describes a method of operation that appears to the writer to be a great improvement over previous methods. The merit of his operation consists in easier access to the joint and the obviation of injury to the facial nerve. Lilienthal's method of approach to the field of operation, with Murphy's method of dealing with the ankylosed joint, constitutes a most ideal method of dealing with ankylosis of the temporo-maxillary joint. There is but little disfigurement following the operation. The function result is all that could be hoped for. The patients are able to masticate all kinds of alimentary substances within a very few weeks after the operation, provided, of course, the wound heals without infection.

The writer's patient was Miss Emma N. B., school-girl, residing with her parents at Yates Center, Kansas. Referred by Dr. West, also of Yates Center, and the regular physician of the family. The child had

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always enjoyed good health until two years previous, when she had typhoid fever. The attack occurred in the autumn of 1909, lasting some twelve weeks; was very severe, and patient was delirious most of the time. During the last week of her fever she was unable to open her mouth. The attendants were obliged to force the jaws apart to give nourishment. After her recovery she still had difficulty in separating the jaws, and mastication soon became impossible. The inferior maxilla was slightly retracted, and she nourished herself by forcing soft articles of diet up between the upper and lower teeth with her thumb and fingers. It required a good part of her time to nourish herself with food and drink. She entered the writer's service at St. Francis Hospital, Wichita, Kansas, and was operated upon September 2nd, 1911. Great care was exercised to obviate vomiting from the anesthetic. The right side was operated upon first. According to the Lilienthal method, the incision was made beginning in front of the auricle extending along the upper border of the zygoma and down to the periosteum, and about $1\frac{1}{2}$ in. in length. A descending incision through the skin only was made beginning at the posterior end of the first incision and extending downward in front of the ear and toward the angle of the jaw, and about $1\frac{1}{2}$ in. in length. The triangular flap of skin was then carefully dissected off and turned downward and forward. The zygoma was now sectioned near the posterior and anterior ends of the incision with a small sharp bone plier in preference to the Gigli saw. The zygoma was then retracted downward carrying along the attached masseter muscle. The region of the ankylosed joint was now easily accessible. There was complete bony synarthrosis, leaving scarcely a vestige of the articulation. A chisel was used to open up the joint and a small sharp bone curette was employed to clear away the adventitious bony tissue operating mostly at the expense of the maxillary condyle. A chisel was then introduced between the condyle and the glenoid fossa, and using the shelving radix of the zygoma for a fulcrum, the condyle was forced downward to still further destroy the adhesions about the joint. A piece of the temporal fascia was now divided so as to leave the attachment to the inner border of the root of the zygoma undisturbed, and it was passed across the articulation between the glenoid fossa and the condyle and stitched with fine catgut. The section of zygoma was now replaced and stitched in place with catgut sutured through the fascia. The skin flap was adjusted with horse-hair sutures. Some mobility of the maxilla could now be observed. Eleven days later the same operation was done on the other side. The jaws could now be separated widely with but little difficulty. Within two or three days the patient could drink water from a glass. But little restriction was placed upon the patient with regard to the use of the jaw. She was allowed, even encouraged, to eat apples after the lapse of ten days. The writer had the dentist make a hard rubber interdental wedge to wear between the teeth for a few hours every day to prevent relapse. The patient still remains well.

JOINT TUBERCULOSIS.

By LEONARD W. ELY, M. D., of Denver.

Definition.—Joint tuberculosis is a proliferative inflammation of the bone-marrow and of the synovia, or of one of them, characterized by the formation of typical tubercles, and caused by the tubercle bacillus. Heredity, if it can justly be regarded as a contributing cause, plays a minor rôle. The influence of trauma has been debated. Trauma may possibly be of importance in some cases starting in the synovia, but not in those starting in the marrow.

Now, in every aspect of this disease the greatest confusion exists. One has only to consult a few authorities to be impressed with the truth of this statement. It will be of advantage then, in our search for the truth, to ask the reason for every statement that is made. In this way we shall not be imposed with a bald affirmation, no matter how eminent the name that is behind it.

Why does tuberculosis affect the ends of the long bones and not their shafts? Various answers have been given to this question.

1. Activity of circulation about the centres of growth at the end of the bone. A profuse blood supply is not a cause of tuberculosis, nor is rapid growth of itself. Other organs of the body are growing fast at the same time as the bones, and they are not, therefore, necessarily a suitable soil for tuberculosis. Growth in the lung does not render it susceptible to the disease.

2. Slowing of the blood-stream in the capillaries of the spongy bone. If this predisposed to tuberculosis in the bone ends, it would probably predispose also to all other infections—acute osteomyelitis, for example. Again, even if the disease started in the ends of the bones for this reason, it would soon spread to the shafts.

3. Exposure to trauma. Trauma itself is not a cause of tuberculosis. Severe injuries, such as fractures and dislocations practically never cause the disease. The portion of the bone where the disease starts is not exposed to trauma, and the tissues of a joint are, of course, designed to withstand the ordinary traumata to which they are exposed. Again, if we injured a muscle, tuberculosis would certainly not ensue.

4. The theory most widely accepted at present is that the disease occurs near the epiphyses of growing bone, because the arteries here are end arteries, and do not anastomose. A plug or embolus of tuberculous material is supposed to lodge in one of these end arteries. The theory is plausible, but on examination does not hold. In the first place, other

organs of the body with a system of end arteries, *e. g.*, the brain, do not show a marked predisposition to tuberculosis. In the second place, this theory would deny the possible synovial origin of the disease. In the third place, an anastomosis is present in the ends of the bones of adults and also in the bones of the carpus and tarsus, and tuberculosis exists in them. In the fourth place, tuberculosis exists in the shafts of such long bones as the ribs without regard to end arteries. Again, a tuberculous 'plug' probably rarely causes the disease.

The reason why tuberculosis occurs in the region of the joints and not in the shafts lies in the quality of the marrow. Two kinds of marrow are usually found in the bone: the red or lymphoid, and the yellow or fatty. Wherever we find lymphoid marrow, there we find the bone vulnerable to tuberculosis; and where we do not find it, there we find the bone immune to a pure tuberculous infection. Thus, we find the disease in the ends of the long bones, and in the short and flat bones, the cranial diploë, the sternum, ribs, etc. In children the lymphoid marrow is found in the shafts of the long bones, and occasionally one sees in them tuberculosis in this situation also. Yellow marrow is composed almost exclusively of fat, and fat tissue is not vulnerable to unmixed tuberculosis. Throughout the body we find in epithelial and lymphoid tissues this marked vulnerability to tuberculosis. The explanation here advanced is so simple that its escape of detection heretofore seems strange. It is of the utmost importance in the treatment also, as we shall see hereafter, and upon its recognition much depends. Any treatment that causes a disappearance of the lymphoid marrow cures bone tuberculosis.

As for the synovia, this is also a lymphoid structure, and is vulnerable also for the same reason to tuberculosis. Any procedure that causes a change of the synovia to fibrous tissue cures the tuberculosis of it.

PATHOLOGY.

We shall not here attempt a detailed description of all the changes wrought in the joint tissues by the morbid process. It is enough to understand the main features, and these main features must be understood if one would undertake to treat joint tuberculosis in a rational manner. Possessed of them one has the key to the entire treatment, and is protected against many absurd ideas that from time to time are advanced.

Joint tuberculosis is essentially a disease of the two lymphoid structures of the joint—namely, the synovia and the red marrow. The original tubercle may be formed in either of these two tissues, and spread to the other, or it may remain indefinitely in its original host. The disease has here, as elsewhere in the body, a tendency to spread, forming new tubercles which often undergo the usual caseation. The main thing that one must keep in mind is that the disease not only starts in the two tissues mentioned above, but, as long as it is uncomplicated by a secondary infection, remains confined to them.

Let us take up the various joint tissues one after another, and trace in them the effects of the disease.

The Marrow.—The deposition of one tubercle bacillus or of several bacilli causes a reaction of the cells of the marrow to form the initial tubercle. The tuberculous inflammation spreads, by the formation of other tubercles, until the red marrow of the bone end, in whole or in part (usually the latter), becomes a mass of tuberculous granulations. When the process is severe, a tuberculous focus is formed which may be recognized by the naked eye. This focus consists of marrow and dead bone, and at first is pink, then yellow or greyish. It is not discrete, and cannot be shelled out of the bone, but is irregular at its borders, and the tuberculous granulations shade off into healthy marrow. In other words, it is not possible to tell by the naked eye where diseased tissue ends and healthy tissue begins. Besides being scattered irregularly through the marrow of the bone end, the tuberculous granulations show a marked predilection for the marrow directly beneath the articular cartilage. So long as these granulations are confined to the marrow we have simply a myelitis, but in the great majority of cases they reach the joint, and set up a tuberculous synovitis, or, better, an arthritis. They can reach the joint in one of two ways. 1. Forming under the articular cartilage they cut off its nutrition, and thus reach the joint through it. 2. They may burst through at the margin of the cartilage, where it joins the synovia. A healthy cartilage is an absolute bar to the progress of the disease. Not until its nutrition is impaired can the granulations perforate it. It follows from this, that, since the articular cartilage draws its nutrition from the marrow beneath it, the disease cannot attack it from the joint side and so make its way into the bone from the joint, but must go in at the margin of the cartilage.

In rare instances the inflammation does not reach the joint, but the granulations burst through the periosteum, and then make their way to the surface.

Coincident with the progress of the disease, Nature instigates her efforts at repair, in the form of fibrous tissue. At times these efforts are feeble, and the new granulation tissue is attacked before it becomes well organized. These are the rapid cases, accompanied often by the formation of abscess, of which more will be said later. In other cases the fibrous tissue is laid down with greater success, and, under the microscope, the tubercles may be seen to be fairly well encapsulated. These are the cases which are characterized clinically by dense fibrous adhesions in the joint. They are wont to be slow in their progress.

When the disease bursts into the joint, it infects the synovia, and then may spread into the marrow of the other bone or bones entering into the formation of the joint.

The deeper layer of the periosteum is liable to invasion, and for our purposes may be considered as an external layer of marrow. This deeper

layer of the periosteum is continuous with the synovia (as the superficial layer is continuous with the ligament), thus facilitating the spread of the disease from one tissue to the other. We see how the tuberculous granulations travel along through tissues that are vulnerable, in regular beaten paths, and when they meet tissues that are invulnerable they do not invade them directly, but, massing about them, destroy their nutrition.

The Synovia.—The synovia is a thin layer of round cells (epithelial, according to some writers; epithelioid, according to others) lining the fibrous capsule of the joint—the ligament or fascia. It is not a distinct structure in itself, and its limits are hard to define, except in the recesses of the joint, where the synovia is thrown into folds, and under the microscope can be seen to be much thicker. This round cell tissue serves as a suitable soil for the deposition and growth of the tubercle bacilli. Sometimes the tubercles can be seen by the naked eye as small cheesy nodules, but more often the synovia simply appears thickened, proliferated, and thrown into folds and villi. When the synovia is inflamed, it has an appreciable thickness, and may be dissected out.

The same efforts at repair are apparent in the synovia as in the marrow, and, according as they are vigorous or the reverse, the synovia comes to be a mass of dense fibrous tissue, or of soft pulpy granulations—joint fungus. In the latter case, especially, the joint contains fluid—serous, hemorrhagic, flocculent, or purulent—as the case may be.

The purulent fluid is not true pus, unless a secondary infection be added, but tuberculous pus—broken down, necrotic material, to which serum and blood-cells have been added.

The disease may remain confined to the synovia indefinitely, or at any time it may make its way into the bone-marrow at the margin of the articular cartilage.

Purely synovial cases are rare in childhood, but fairly frequent in adult life.

The Bone.—Bone tissue itself is never invaded by tuberculosis. It simply reacts secondarily to the disease of its contained marrow. A mild irritation in the marrow causes a hypertrophy of bone; a stronger irritation, an atrophy. If the inflammation in the marrow be very severe, it kills the bone. Hence, when the disease is spreading, we see under the microscope the osteoclasts in the marrow eating up the bone. The tuberculous granulations surround the bony trabeculae, cut off their nutrition, and kill them. If the process be slow, the bone is killed in small pieces, manifest as 'bone sand.' If the disease be more rapid, the bone is killed in macroscopic pieces—sequestra.

In old cases that have recovered, or that are quiescent, the thickened trabeculae about the tuberculous focus reinforce the protective fibrous encapsulation.

The Cartilage.—This, like the bone, is not subject to tuberculous in-

vasion, but suffers in its nutrition from disease in the subjacent marrow, and, to a lesser extent, at its margins from disease in the synovia. The structure of the cartilage, it will be remembered, shades off into that of the synovia.

One of the first evidences in the cartilage, as a rule, of disease in the marrow is a fibrillation of its structure. Then, as the disease progresses, the tuberculous granulations may push their way up through the cartilage and gain the joint cavity. If the cartilage be not perforated, the granulations spread out underneath it, and enter the joint at the margin, or else throw it off entire.

Layers of fibrin are described as precipitated on the surface of the cartilage in joint tuberculosis. The writer has never been able to identify them.

The amount of function that remains in a cured tuberculous joint depends largely upon the damage done to the articular cartilage.

The Ligament.—This structure plays a passive rôle in joint tuberculosis, and may be ignored except for its mechanical function.

Tuberculous Abscess—Cold Abscess.—A tuberculous abscess may be formed in the bone-marrow or in the cavity of the joint. It is composed of serum, necrotic material, leucocytes, and sometimes contains red blood-cells, and pieces of dead bone. Tubercle bacilli are often present in small numbers. When the abscess is in the joint cavity its walls are composed of the tuberculous synovia and of the cartilage; when in the bone, they are composed of the necrotic marrow and bone.

Sooner or later the abscess almost invariably ruptures the joint capsule and gains the circumarticular structures. Then its walls are composed of a layer of necrotic tissue. If a secondary infection be added, tubercles are formed in this necrotic tissue, but otherwise they are not found there. This has an important bearing on the treatment. If a tuberculous abscess be opened, or if it rupture spontaneously, it almost always becomes secondarily infected, and may continue for years to discharge pus through one or more openings, called sinuses.

The subject of the pathology of joint tuberculosis is a most interesting and absorbing one, but space forbids that we should pursue it further at this time.

The bones of a limb, the seat of a tuberculous joint, suffer in their nutrition, and are more slender than on the well side.

SYMPTOMATOLOGY.

The main symptoms of the disease are those of any 'proliferative' joint inflammation—namely, pain, restriction of motion, disability and deformity.

The pain may be severe or mild. It is usually worse in the bony than in the synovial cases. It may be in the joint or it may be 'referred.' It sometimes comes on in paroxysms at night, when the muscular spasm re-

laxes, and wakes the patient up with a cry—night cry. It may be worse in the morning at first, and gradually wear off during the day. When abscesses are under tension in a joint, the pain is aggravated.

The restriction of motion varies from a slight limitation at the extremes of the normal range to an ankylosis more or less complete.

The disability is the result of the pain, the deformity and the muscular spasm. It consists essentially of an interference with the function of the joint.

If the joint be superficial, sensitiveness to pressure is usually present. Muscular spasm and muscular atrophy are more prominent in the bony type than in the synovial. The joint may be swollen or it may not. Swelling, if due to a fungous proliferation of the synovia, is boggy; if due to fluid, is fluctuating.

The deformity is the result of the swelling, the muscular spasm, and the atrophy. This also varies greatly.

The Roentgen picture is exactly what one would expect. The bone shows rarefaction in irregular areas. It has a 'worm-eaten' appearance. The cartilage is usually thin, and eroded in spots. In slow cases, areas of rarefaction are accompanied by areas of condensation of bone. The synovia is thickened.

Abscesses appear as fluctuating, painless, slow-growing swellings; symptomless unless they exert pressure on vital structures. When secondarily infected, they become painful, and produce constitutional symptoms. After rupture, operative or spontaneous, they become almost invariably infected, and discharge large quantities of foul pus. Their walls then are thickened, infiltrated and 'porky.'

Amyloid degeneration of the viscera, fever, and marked constitutional disturbance are concomitants of secondary infection. The first only supervenes after prolonged suppuration.

Pulmonary and other visceral tuberculosis frequently accompany joint tuberculosis. Tuberculosis meningitis is fairly frequent in children.

DIAGNOSIS.

The diagnosis may be fairly easy or it may be extremely difficult. That we are dealing with a proliferative inflammation of the synovia and of the bony marrow it is easy to establish; but this inflammation may be due to any one of a number of different causes besides tuberculosis—to syphilis, gonorrhea, 'cryptogenic' infection, etc.

Tuberculosis is wont to be slow, chronic and uniarticular. A tuberculin test is positive, and if fluid can be withdrawn from the joint, it will produce tuberculosis in a guinea-pig when injected into its abdomen. Enlargement of the bone ends and exostoses never occur in tuberculosis. An actual outgrowth or proliferation of a mass of bone never occurs. Tuberculosis is the only joint disease that is ever accompanied by a cold abscess.

Syphilis gives a Wassermann reaction. A careful examination of the shafts of the bone with an *x*-ray machine will often reveal a productive osteitis. Other signs of syphilis are often present.

Gonorrhea is often multiarticular. A search of the genito-urinary apparatus shows evidences of gonorrhea.

The 'cryptogenic' joint inflammations are wont to be multiarticular. If uniarticular, they are often extremely difficult to distinguish from tuberculosis; and numerous examinations may be necessary before we can arrive at a positive diagnosis.

Other diseases which must be excluded are acute inflammatory rheumatism, acute arthritis, hemophilia, tabetic osteo-arthritis (Charcot's joint), hysteria, scurvy, etc.

PROGNOSIS.

The prognosis *quod vitam* depends largely upon the severity of the infection, the quality of the treatment, and the resistance of the patient. Uncomplicated joint tuberculosis is not of itself dangerous to life. Secondary infection and the complications are what we must fear. In a general way, the larger the joint the worse the prognosis. In children the prognosis is better than in adults.

As to function: The prognosis varies between a good range of motion and ankylosis. Children may recover with a good functional result. In a general way, the smaller the joint, the better the outlook for motion. In adults, perhaps with very rare exceptions, the best we can hope for is a stiff joint under any method of treatment. Secondary infection immediately makes the prognosis much worse. In any joint tuberculosis the fact of the patient's poor resistance to the infection must always be borne in mind, and the possibility of the outbreak of tuberculosis in some other organ of his body. Amyloid degeneration is always fatal, unless the limb can be amputated at the inception of this complication.

TREATMENT.

Into all the minutiae of treatment we shall not enter here, but, referring to the pathology, we shall deduce the main points. With these in mind one is better able to conduct the treatment of a case of joint tuberculosis than if one's mind is filled with loose facts and theories.

We have learned that the disease is essentially a tuberculous inflammation of the synovia and the lymphoid marrow. Now, the presence of these two tissues is dependent upon function in the joint. If function be removed, these two tissues disappear. If they disappear, the disease dies out. Without them there can be no such thing as joint tuberculosis. The disease dies out because it has no food. It is starved out. From this we deduce our first rule: Deprive the joint of function.

In adults we may never hope for good function, except in the very mildest synovial disease. Conservative methods are slow and require

at least three or four years. Radical measures attain the same results in a few months, and probably entail less danger to the general health.

In children, on account of the interference to growth and the consequent crippling and unsightly deformities which they entail, radical measures are rarely justifiable; in fact, they are only permissible as a life-saving measure. Again, it is the almost universal opinion among men who have practised conservative treatment, that tuberculous joints of children may be cured thus, often with a fair amount of function. Our second rule, then, is: In adults the treatment is almost invariably radical; in children, conservative.

We have seen that as long as the tuberculous inflammation is uncomplicated by a secondary infection, it is strictly limited to the synovia and to the lymphoid marrow, and is not necessarily dangerous to health; while, if a secondary infection be added, other tissues, previously immune, are attacked, and the danger is greatly augmented. From this we deduce our third rule: Avoid secondary infection by every possible means.

RADICAL TREATMENT.

Two distinct operations have a field in joint tuberculosis: (1) Resection; (2) amputation.

Resection.—In the majority of cases this will be the operation of choice, and, when it is undertaken, it is undertaken with two objects—namely, to destroy function in the joint, and to avoid secondary infection. No attempt is made to dissect out the tuberculous synovia or to remove the diseased marrow. All such drugs as iodoform, formalin and carbolic acid are discarded as useless or worse. If we use drains we remove them very soon in order to guard against secondary infection. Drains do not provide so much for the exit of tuberculous material as they do for the entrance of pus germs.

In the knee our aim is to produce a bony ankylosis; in the hip, a bony ankylosis or a dislocation; in the shoulder, a bony ankylosis; in the elbow, an ankylosis or a fibrous union of the bones. In the wrist, as a rule, we strive for a bony ankylosis.

In the tarsus or carpus, if the disease be detected in one of the bones, before invasion of a joint cavity, it may occasionally be cured by removal of this bone. Otherwise a very extensive resection or even an amputation will probably be necessary.

Amputation.—In patients whose vitality is very low, and in whom the processes of repair are not sufficient to bring about repair after a resection, we resort to an amputation primarily. Otherwise this operation is reserved for cases that have resisted milder measures. It is often indicated in extensive carpal or tarsal disease.

It follows from what has been said that all curetting operations on tuberculous joints, as well as scraping, draining and packing are not only

useless, but are harmful. Any attempt to remove a tuberculous focus from a bone is almost certainly doomed to failure. Indeed, the favorite location of the tuberculous granulations, directly beneath the articular cartilage, makes this operation seem futile.

CONSERVATIVE TREATMENT.

The sole object of conservative treatment is to deprive the joint of function, at the same time preventing deformity, or correcting it if it has already taken place. Remembering that a certain amount of ankylosis may usually be expected, we place the joint in the position most favorable for the use of the limb, and hold it there until the disease is well. All mobilizing operations, passive motion and massage are contraindicated during the active stage of the disease, and afterwards. Some surgeons prefer plaster-of-Paris dressings, some braces, some use both to meet special indications. Under no circumstances should a patient be sent to a brace-maker to be fitted for a brace. To do this is equivalent to turning a patient with pneumonia over to the apothecary for treatment, or a patient with defective eyesight over to the optician. The ignorance and neglect of joint cases by the regular profession are probably responsible for osteopathy and chiropractic. These cases need skilled and persistent treatment.

The Bier treatment by passive hyperemia probably has a field in joint tuberculosis, though its efficacy has been rather exaggerated.

Tuberculin up to date has not justified the expectations that were entertained of it.

The good effects of injections into these joints are problematic. All sorts of chemicals have been advocated, from charcoal to carbolic acid and iodoform. To aspirate a joint and to inject something into it seem perfectly rational to one unacquainted with the pathology.

Cold abscesses, if deeply situated, small and symptomless, should be let alone in the lively hope of their disappearance. If larger and approaching the surface they should be aspirated, under strict asepsis, repeatedly if necessary. We may inject some chemical into their cavities if we wish, but probably firm pressure is about as useful.

During the entire course of a joint tuberculosis we must not forget that we are combating a local manifestation of a chronic disease, and must always adopt the necessary constitutional treatment. Fresh air, good food and careful attention to the functions of the body are most important. The writer is a firm believer in climate in the treatment of pulmonary tuberculosis, but regards it as negligible in tuberculosis of the joints, unless a pulmonary complication be present. Frequently the general health of a patient with a joint tuberculosis will improve after a resection.

UNILATERAL KIDNEY CALCULUS COMPLICATED BY
URETEROCELE OF THE OPPOSITE SIDE.

By B. S. BARRINGER, M. D., of New York.

A ureterocele is a dilatation of the intravesical portion of a ureter. This dilatation is dependent upon a narrowing or stricture of the ureteral opening. It is probable that this strictured condition is always congenital, notwithstanding that such a condition has been attributed



Fig. 1.—Radiograph of stones in left kidney.

to the passage of calculi or blood clots through a ureter. The fact that they are sometimes bilateral, and that in 2 cases recently reported a double ureter accompanied the ureterocele, emphasizes the probability of congenital origin of the stricture.

The writer has seen but 2 cases of ureteroceles, one bilateral and the other, that which he wishes to report, unilateral. The fully developed cyst is readily identified by the cystoscope. The cyst fills with each efflux of urine, and the mouth of the cyst, the ureter orifice, is so small as to take only the smallest ureter catheter. When these cysts are not at all advanced and there is the merest dilatation occurring at each time urine is excreted, the diagnosis is difficult.

Operation is indicated in all these cases of ureterocele because the cyst is evidence of renal retention and causes secondarily hydro-nephrosis or pyonephrosis and reduced kidney function. The simplest

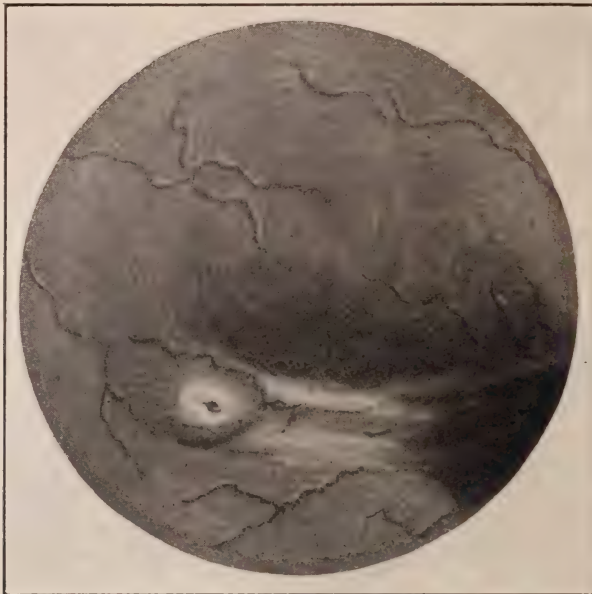


Fig. 2.—Cyst of right ureter which was incised before the stone was removed from the opposite kidney.

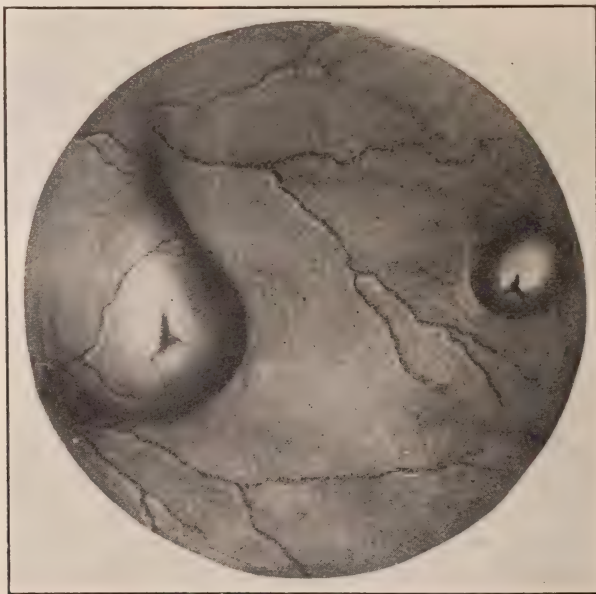


Fig. 3.—Case of double ureterocele. The cyst on the left (right ureter) larger than the one on the right (left ureter).

operative procedure and, as far as the writer's experience goes in one case, the best is incision of the ureteral orifice. This is easily

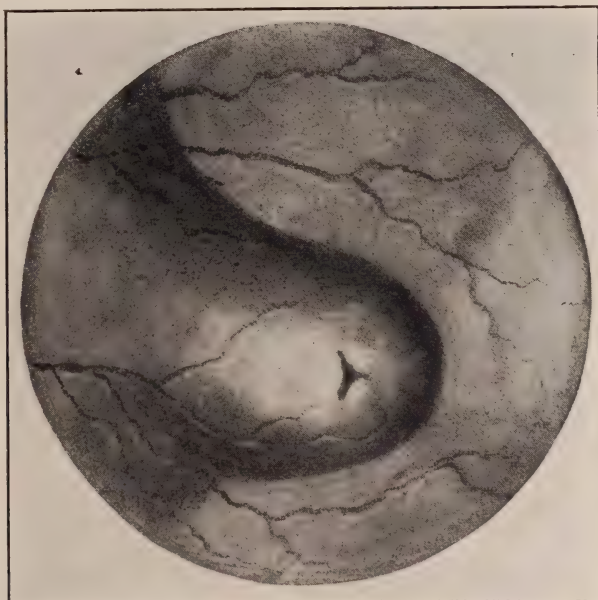


Fig. 4.—Same as Fig. 3. Cyst of right ureter quiescent.



Fig. 5.—Same as Fig. 3. Cyst of right ureter during excretion of urine.

done with a sharp knife through an open tube. The writer cannot see any reason, unless the cyst be extremely large or the orifice inaccessible

to the cystoscope, for a suprapubic operation or for suturing each edge of the incised ureteral orifice.

Mrs. S., *æt.* fifty-five, gave a history of attacks of left kidney pain and kidney colic. The attacks for two years past have incapacitated her both for work and pleasure. When first seen in April, 1910, her left ureter was catheterized with a 7 F. catheter, and while nothing abnormal was recognized about her right ureter orifice, it could not be catheterized, however, and the urine from the right kidney was collected from a bladder catheter. The writer attributed the failure to catheterize the right ureter to himself rather than to any abnormality of the ureter orifice. The analysis of the collected urines was:—

Right Urine.	Left Urine.
Quantity, 26 c.cm.	25 c.cm.
Urea, 16½ grm. per litre.	11½ grm. per litre.
Urea Vol., 0.427 grm.	0.287 grm.
Microscopical.	
Red blood cells: Present (traumatic)	Rare
Pus: None	Much
Epithelium: Rare squamous	Many cells probably coming from kidney pelvis.
Indigo-carmin test:	Blue in twenty-five minutes; never as marked as on right.
Blue in fifteen minutes.	
Marked in twenty-five minutes.	

On a radiograph (Fig. 1) a very large calculus was shown in the left kidney. The writer saw the patient again in October, 1911, at which time he also failed to catheterize the right ureter even when using a very small, 4 F., olivary catheter. On close observation of the right ureter orifice (Fig. 2) during urinary excretion, a considerable cystic dilatation was noticed and the condition was diagnosed as a ureterocele.

The analysis of the urines collected at that time was as follows:—

Right.	Left.
Vol. 4 c.cm.	9½ c.cm.
Urea, 5½ grm. to litre.	4 grm. to litre.
Urea vol., .027 grm.	.038 grm.

While the urine was collected for but a short time, and the results for this reason may not be entirely accurate, the function of the right kidney by the urea-volume appeared to be less than that of its fellow kidney which harbored the stone. Because of the age of the patient, her poor condition and the gravity of nephrotomy, the writer did not care to remove the calculi from her left kidney until the right kidney was acting properly.

On the advice of Dr. Keyes, a small cystoscope was introduced into the bladder, and beside it a small knife with which the right ureter orifice was incised. This proved to be an awkward way of operating, and if the occasion should arise again, the writer would use a simple open tube, pass the knife through the tube and incise the cyst, or use an operative cystoscope. A couple of weeks before the ureterocele was incised, the patient complained of an entirely new pain in the right kidney region. This pain disappeared immediately after cutting the ureteral orifice. Two months later, the writer passed a 7 F. catheter up the right ureter whose orifice had been incised.

At that time the function of the two kidneys was as follows:—

Right.	Left.
Vol. 44 c.cm.	105 c.cm.
Urea, 5 grm. to litre.	2 grm. to litre.
Urea vol., 0.220.	0.210 grm.
Phenolsulphonephthalein, 18 per cent. in first half hour.	10 per cent. in first half hour.

In this test, both by the urea-volume and phenolsulphonephthalein, the function of the right kidney was better than the left. The calculi were then removed from the left kidney by nephrotomy, and the patient made an uneventful recovery.

109 East 34th Street.

UNILATERAL RENAL HEMATURIA CURED BY PELVIC INJECTIONS OF ADRENALIN. REPORT OF TWO CASES.

By JOHN R. CAULK, A. M., M. D., of St. Louis.

In the abstract department of this issue, the writer has given a brief outline of the causes of unilateral renal hematuria. It is to be noted that many of the authors are attributing unilateral bleeding to nephritis and that many are advising immediate renal decapsulation. It is also to be noted that many authors have stated what most of us have realized—that bleeding may originate from a nephritis which shows no clinical evidences of the disease. In contradistinction to the foregoing, the writer reports 2 cases of unilateral bleeding, both of which demonstrated clinical evidences of nephritis, such as the presence of casts and albumin in the urine and a slight diminution of renal function, and which were cured by pelvic injections of adrenalin, the nephritis evidently taking no part in the production of the bleeding.

These cases are reported to demonstrate, not only the value of pelvic injections in case the hematuria originates in the pelvis, but also as a warning to the profession against immediate radical measures in the treatment of unilateral renal hematuria in cases bearing clinical evidences of nephritis, and to urge that more conservative measures, such as pelvic injections, be tried first as a means of differentiation.

CASE I.—Male, *æt.* fifty-one, married. Complaint: Passing of blood in urine; low backache. History in brief: Nothing of importance in his family history. Patient has always been healthy; no venereal diseases. No chronic pulmonary, cardiac, or gastro-intestinal diseases. Always lived moderately; never used alcohol. For a year or so has had occasional ache in the small of the back which has become worse of late. Two weeks before admission, patient noticed that his urine was bloody. This continued steadily until the latter part of November, when he consulted the writer. There has been no pain or urinary distress. No symptoms referable to either kidney. No chills, fever, or sweats; no headaches, no trouble with vision, but has been subject to frequent spells of nausea. Has lost no weight.

Examination.—Patient is well preserved, somewhat sallow; heart and lungs negative. Abdominal examination, negative. External genitalia, negative. Urine voided in three glasses, all three were bloody, blood being dark. Prostate slightly enlarged, indurated, not tender; seminal vesicles, negative; no inter-vesicular plateau and no evidences of malignancy. Cystoscopic examination: Catheter passes easily; no residual urine; bladder capacity normal. Cystoscope shows a normal bladder and normal internal orifice. Both ureteral orifices normal in appearance; blood seen to issue from left orifice.

URETER CATHETERIZATION.

RIGHT.

Trace of albumin.
Epithelial cells, no pus cells.
No bacteria. Occasional hyaline cast.
Phenolsulphonephthalein appeared in nine minutes.
First hour output: 21 per cent.

LEFT.

Heavy albumin.
Bloody, many red blood cells, few white blood cells.
Occasional hyaline cast.
No bacteria.
Phenolsulphonephthalein appeared in nine minutes.
First hour output: 16 per cent.

X-ray of kidneys negative. Pyelogram of left kidney pelvis, normal. On December 20th, the left renal pelvis was injected with 1 to 2000 adrenalin which was allowed to remain in for a few minutes. On December 21st, patient returned to office and passed urine which was perfectly clear. A message from the patient, on March 1st, states that there has been no bleeding at all since the injection. Patient was advised to examine his urine closely from time to time.

CASE II.—Male, *et.* forty-two, married. Complaint: Blood in urine. History in brief: There is absolutely nothing of importance in the family or personal history of this patient, with the exception of a gonorrheal infection at the age of nineteen. Five weeks before admission, patient noticed blood in his urine. Bleeding was constant and painless; no urinary symptoms except blood. No symptoms referable to kidneys; no chills, fevers, or sweats; slight loss of weight.

Examination.—Patient is a slender man, somewhat pale. General examination of chest and abdomen reveals nothing of importance. Kidneys not palpable, and there is no tenderness in the kidney regions. External genitalia normal except an indurated globus minor on the right side. Rectal examination: Prostate normal in size, soft, not tender, seminal vesicles negative. Cystoscopic examination: Catheter passes easily; no residual urine; bladder capacity normal; cystoscope shows a normal bladder. Blood is seen issuing from right ureteral orifice.

URETER CATHETERIZATION.

RIGHT.

Heavy albumin, bloody, many blood cells. Few white corpuscles. Occasional hyaline and granular casts. No bacteria. Phenolsulphonephthalein appeared in ten minutes.
First hour output: 13 per cent.
Second hour output: 10 per cent.

LEFT.

Slight trace of albumin.
Epithelial cells, few hyaline and granular casts, no bacteria. Phenolsulphonephthalein appeared in eight minutes.
First hour output: 14 per cent.
Second hour output: 13 per cent.

X-ray negative. On October 16th, ureter catheter was passed into renal pelvis and the pelvis injected with 1 to 2000 adrenalin solution. The solution was allowed to remain for several minutes. Within twenty-four hours patient's urine was perfectly clear and has remained so until the present time. There are still albumin and casts in the urine.

The lesion which is responsible for the bleeding in these 2 cases was undoubtedly in the renal pelvis, and whether it was a varicosity, an erosion, or a papillitis, the writer is not prepared to say. The points that he wishes to emphasize are that one must not be too hasty in at-

tributing unilateral bleeding to nephritis; that at first pelvic injections should be tried in order to rule out the pelvis even when there are clinical evidences of nephritis; that in the 2 cases reported there was evidence of a slight diminution of renal function, as evidenced by the phenolsulphonephthalein output, and that the bleeding in both cases was painless and constant. The writer does not wish to be misunderstood in his attitude toward unilateral renal bleeding. He is thoroughly convinced that many of the cases are due to nephritis. Many of the cases, however, are due to pelvic lesions, and these should at first be proved or disproved before any radical measures for the treatment of nephritis, such as decapsulation, are undertaken.

MEDICAL AND SURGICAL PROGRESS.

INSOMNIA AND ITS TREATMENT.

A REVIEW OF RECENT LITERATURE.

By ALBERT E. TAUSSIG, M. D., of the Editorial Staff.

1. Benedek: Luminal. (*Wien. klin. Wochenschr.*, No. 42, p. 1571, 1912.)
2. Buergi: Action of Drug Mixtures. (*Berl. klin. Wochenschr.*, No. 20, p. 877, 1911.)
3. Dornblueth: Sleeplessness and Its Treatment. Leipzig. 1912.
4. Fränkel: Heroin in Cardiac Asthma. (*Therap. Monatschr.*, No. 1, p. 14, 1912.)
5. Halle: A Practical Antiphone. (*Deutsch. med. Wochenschr.*, No. 1, p. 27, 1913.)
6. Læhr: Acute Psychosis Following the Chronic Use of Veronal. (*Allg. Zeitschr. fuer Psych.*, No. 4, Vol. 69.)
7. Meyer: Treatment of Insomnia. (*Deutsch. med. Wochenschr.*, No. 37, p. 1721, 1912.)
8. Von Noorden: Veronal. (*Therap. der Gegenw.*, No. 6, 1911.)
9. Von Oy: Codeonal. (*Med. Klin.*, No. 49, p. 1991, 1912.)
10. Rosenfeld: Luminal. (*Therap. der Gegenw.*, No. 8, p. 361, 1912.)

When we speak of insomnia, we ordinarily do not use the word in its literal sense. Absolute sleeplessness, extending over more than a night or two, really occurs only occasionally in cases of severe psychoses. Ordinarily, the word is used to express various grades of insufficient sleep. Even when patients assure us that they have not closed an eye for a week or more, the truth is merely that they have slept but little, and that the resulting fatigue and discomfort of the following morning leads them to assume that they have spent an absolutely sleepless night.

Normal sleep may be considered to be of two types. The one, more common in young people, has its period of deepest sleep during the first half of the night. The other, characteristic of adults, has its period of profoundest and most refreshing slumber towards morning. Similarly, insomnia may take on either of two forms. The patient may find it very difficult to go to sleep. Hour after hour of wakefulness is followed, perhaps towards morning, by a few hours of insufficient slumber. On the other hand, the patient may go to sleep soon after retiring, but during the course of the night he awakes, thereafter to sleep no more. The latter is the more usual form taken by chronic insomnia, and is ordinarily much more intractable than the other.

Simple, idiopathic sleeplessness, without other simultaneous evidence of disease, practically never occurs. The nearest approach to this condition is the insomnia that sometimes follows acute infectious diseases, especially influenza. Meyer states that he has occasionally seen periodic attacks of insomnia, which he interprets as an equivalent of periodic psychoses. This last is one of the forms most intractable to treatment. With these rare exceptions, insomnia is always the result of some disturbance or a symptom which, like any other, goes to make up the symptom-complex of a disease. Herein lies the key to a rational therapy.

The diseased condition responsible for the sleeplessness must be identified and treated. Nevertheless, palliative measures are often required, since this symptom often occupies the foreground of the patient's complaints, and by its persistence interferes with the success of more fundamental therapeutic measures.

The insomnia of children is often purely nervous in its origin. Excitable young people often sleep poorly after any unusual nervous strain or excitement, or after unusual physical exertion. This may be of a grade that does not affect normal children at all. Such excitable children must be made to lead a more quiet life. The insomnia of children with a definitely abnormal psychic constitution is a much more intractable affair, and is often connected with hallucinations or illusions which prevent sleep. The treatment of these cases must be directed towards a strengthening of the physical and nervous constitution, and often results in failure unless the children are removed from their unwholesome mental environment. Prolonged isolation from the other members of their family is often indispensable. Hypnotic drugs are rarely indicated.

In adult life, insomnia is much more common than in childhood. It may be the result of pain of whatever origin, or of extreme discomfort, as in dyspnea, asthma, or pruritus. Occasionally it may be the first manifestation of an organic disease of the nervous system, especially of paresis, brain tumors and cerebral lues. Meyer has seen insomnia, especially that consisting in an early awakening, in cerebral arteriosclerosis.

A variety of intoxications are characterized by sleeplessness. This is especially the case with excessive use of alcohol, tobacco, coffee, or tea. In these cases, the patient's only complaint may be the insomnia, so that the cause of the latter is readily overlooked. Ordinarily, however, other nervous and circulatory disturbances are also present. The insomnia of morphinism, especially during the withdrawal of the drug, need merely be mentioned, being one of the most difficult features in the treatment of this condition.

The most common causes of insomnia are the functional neuroses, including hysteria, neurasthenia and the like. Such patients are either kept from going to sleep by a constant flood of mental images or, after having slept, they are awakened by vivid dreams, often with motor accompaniments. These may be so terrifying that the patients fear to go to sleep, and so intentionally keep themselves awake. A similar, but less extreme, form of insomnia is that due to overwork or to the over-excitement of modern city life, conditions that may show themselves only by the inability to obtain sufficient sleep. The insomnia, that often accompanies the nervous manifestations of the climacteric, may also be mentioned.

THERAPY.

The rational treatment of insomnia must always be directed towards the underlying cause. Thus in cardiac incompetence—digitalis; in phthisis—sleeping outdoors; in fever—cool baths are the most efficient hypnotics. Often, however, the sleeplessness itself so saps the patient's vitality that no therapy can be efficient unless the insomnia is relieved. Hence, the necessity for special treatment directed towards this complication.

Hygiene.—The importance of a proper environment is obvious. A suitable bed, sufficient but not too much cover, open windows and a silent neighborhood (sometimes replaced by vaselined cotton, or, as suggested by Halle, little balls of paraffine inserted into the external meatus), sometimes make the difference between sleep and wakefulness. A heavy meal at bedtime is often provocative of insomnia, while a light and easily digested one may act as a soporific. Sufficient exercise or, in the case of bedridden patients, light massage, are often indispensable. In this connection, it must be remembered, however, that with neurotic or asthenic individuals a slight excess of either may aggravate the insomnia.

Of the various simple means for inducing sleep as slow counting, deep breathing and the like, the procedure advocated by Learned deserves mention. The patient lies on his back and, first of all, endeavors to touch the head and foot of his bed simultaneously by stretching his body. This brings into play many muscles not used during the day. He then raises his head about one inch above the pillow and holds it so, meanwhile breathing very slowly and deeply. Soon the head becomes too heavy to hold up and is allowed to fall back upon the pillow. The same procedure is repeated first with the right foot and then with the left. The head is then again raised and so forth. A few cycles of this sort often suffice to induce sleep.

Hydrotherapy.—In somewhat more obstinate cases, hydrotherapeutic measures are often effective. Of these, the most efficient is the wet pack. A large blanket, about 8 by 9 ft., is laid across the bed and on it is placed a sheet, wrung out in water at 55 to 60° F. The patient, whose head and neck have been cooled with cold water, lies down on the sheet. The attendant rapidly folds the sheet over him, tucking it between the arms and the body and between the legs, so no two surfaces of skin touch each other. It is especially important that the sheet fit snugly round the neck, which may be accomplished by making its two upper corners cross each other over the chest. If the patient suffers from cold feet, the latter may be allowed to protrude beneath the sheet. The blanket is then wrapped about the patient in similar fashion, again being careful that it fits snugly over the shoulders; the lower end of the blanket is tucked under the feet. The whole procedure must be done neatly and rapidly so that, when it is complete, the patient looks like a mummy in its wrappings. He is allowed to remain in this pack for one-half to one hour. It is then removed without chilling the patient, unless the latter is asleep, when it may be left on all night or until he wakes. A single pack often produces sleep. Even when it is apparently without effect, a repetition of the pack every night often results in the re-establishment of the habit of sleep. In very sensitive patients the pack may be confined to the lower half of the body—the legs or even the calves—but these partial packs are much less effective.

The lukewarm baths also deserve mention in this connection. The pa-

tient remains in the bath, at about 90° F., for fifteen to twenty minutes, and then returns to bed, without being rubbed or chilled. If the full bath is not practicable, a sitz-bath at 85° F. slowly cooled down at 75° F. may be substituted. Bran, or other glutinous substance, may be added to the water. Sometimes a cold sitz-bath, at 70 to 45° F., may prove effective. This is, however, contraindicated if there is any pelvic congestion.

Drugs.—Except when the sleeplessness is due to pain, opiates are in general to be avoided. An exception to this rule is formed by the insomnia of heart disease with broken compensation. Even here an attempt should be made with the use of milder hypnotics, but it happens often enough that nothing short of morphine will give the patient rest. Just how the morphine acts in such cases is not quite clear. In part, its action may be that of a general sedative; in part, it may blunt a hypersensitive respiratory centre; in part, it seems to have a directly favorable influence upon the circulation by slowing the heart's action. In milder cases of broken compensation it may be given, by mouth, in very small doses, 0.003 gm. or less, best in combination with digitalis, frequently repeated. If there is much dyspnea, still more if the patient is suffering from cardiac asthma, a single large dose, 0.01 to 0.015 gm., should be given hypodermically at bedtime. In these cases two smaller doses are usually less effective than a single large dose. The disadvantage of the morphine is that the patient soon becomes refractory to it. Larger doses must be given, and ultimately a stage is reached in which very large doses are of no avail. Fränkel states that heroin does not result in this habituation on the part of the patient, and hence is to be preferred. Our own observations lead us to concur with him in this. We have given heroin hypodermically every night for weeks without noting any impairment of its effectiveness. The initial dose should be 0.005 gm. which may gradually be increased to 0.01 gm. Fränkel reports a case in which the administration of 0.03 gm. heroin led to a prolonged paralysis of the respiratory centre, necessitating artificial respiration lasting two hours. It is interesting to note that even in this case there was no impairment of the heart's action.

Of the simple sedatives, valerian is often worth trying. Whether its mode of action is chiefly through suggestion or not, the fact remains that its administration is often of avail in the milder forms of insomnia. The bromides, too, are often useful, whether given in broken doses during the day or in a single dose at bedtime. Large doses are sometimes necessary to produce results, 5 gm. at bedtime being not excessive if a subsequent repetition of the dose is not intended.

Chloral hydrate is certainly very effective, but has justly fallen somewhat into disrepute on account of its deleterious effect upon the circulation. It may be replaced by paraldehyde, which is, however, difficult of administration on account of its disagreeable taste.

Of late years, the enterprise of the German pharmaceutical laboratories has resulted in the introduction of a great number of synthetics with more or less useful hypnotic properties. Most of them are derivatives of the methane homologues and differ from each other by the substitution of some of the hydrogen atoms by various radicals. The first to attain popularity were trional and sulphonal, in doses of 1.0 to 2.0 gm. They are fairly efficient, but somewhat toxic, occasionally producing hematuria, especially in cases of morphinism and renal disease. They have yielded in popularity to the newer synthetics.

Diethyl-barbituric acid (veronal) and its sodium salt (medinal, veronal-sodium), are among the most popular. In doses of 0.5 to 0.1 gm. they induce sleep with reasonable certainty, in the absence of pain or marked dyspnea. They have no depressant action in this dose, but are often followed by more or less discomfort next morning. Their continued use may give rise to a habit, and Læhr reports a case of acute psychosis following the chronic use of veronal. The advantage of the sodium salt over the acid lies in the greater solubility of the former. In doses of 1.5 to 3.0 gm. it may be given by rectum, and is especially useful for the insomnia and nausea following general anesthesia. Both veronal and veronal-sodium have been highly recommended for seasickness.

It would be quite impossible to mention all these newer somnifacients. Two, that have been especially praised, are adalin (1.0 gm.) and luminal (0.8 gm.). Both are mild in their action and apparently quite free from unpleasant after-effects.

A definite advance in our knowledge of the best way to utilize the hypnotics was marked by the work of Buergi. He showed, on the basis of animal experiment, that if two or more hypnotics of the same pharmacological character are used in combination, the resulting effect is merely that of the sum of the two taken separately. Two or more hypnotics, of a different pharmacological action, on the other hand, given together, exhibit a potency much greater than the sum of their individual power. There is thus nothing to be gained by giving veronal and trional together, or either with chloral. On the other hand, the addition of a small amount of morphine or bromide to a methane hypnotic greatly increases the power of the latter. Advantage of this law has been taken in the manufacture of a new synthetic called codeonal. Each tablet consists of 0.02 gm. codein diethyl-barbiturate and 0.15 sodium diethyl-barbiturate, the average dose being three tablets. Its action is said to be pleasant and certain. It will be seen that, practically, codeonal consists in a combination of codein with veronal, and its effect probably does not differ from that of these two drugs given together. Similarly, bromural is an example of the simultaneous administration of bromides with the methane hypnotics.

Another group of drugs that apparently increases the activity of these hypnotics is that of the antipyretics. The combination of acetphenetidin with veronal, first advocated by von Noorden, is especially useful, comparatively small doses of the combination producing results equal to those of larger doses of either separately. In somewhat larger doses we have found it efficient in insomnia produced by a moderate degree of pain.

CERVICAL RIB.

A REVIEW OF RECENT LITERATURE.

By M. G. SEELIG, M. D., of the Editorial Staff.

1. Asher (*Neurol. Zentralbl.*, No. 23, p. 625, 1904).
2. Barker (*Deutsch. Zeitschr. fuer Nervenheilk.*, Bd. 8, Hft. 5-6, 1896).
3. Beck (*Fortschr. aus dem Geb. der Roentgenstr.*, Bd. 8, p. 43, 1904-05).
4. Drehmann (Quoted by Streissler, *Verhandl. der deutsch. Gesellsch. fuer Orth. Chir.*, April, 1906).
5. Eckstein (*Prag. med. Wochenschr.*, p. 213, 1908).
6. Ehrich (*Beitraeg. zur klin. Chir.*, Bd. 14, p. 198, 1895).
7. Fischel (*Anat. Heft.*, Bd. 31, p. 463, 1906).
8. Fischer (*Deutsch. Chir.*, Lfg. 34, 1880).
9. Gordon (*British Med. Journ.*, June 8th, 1901).
10. Gruber (Quoted by Streissler).
11. Helbing (*Zeitschr. fuer Orth. Chir.*, Bd. 12, p. 216, 1904).
12. Keen (*Amer. Journ. Med. Sciences*, February, 1907).
13. Krausse: Inaugural Dissertation. Leipzig. 1902.
14. Kröencke: Inaugural Dissertation. Kiel. 1894.
15. Lauterbach (*Wien. med. Wochenschr.*, p. 1462, 1902).
16. Meyrowitz (*Beitr. zur klin. Chir.*, Bd. 66, Hft. I, 1905).
17. Murphy (*Surg. Gyn. and Obstet.*, October, 1906; *Annals of Surg.*, March, 1905).
18. Plummer (*Surg. Gyn. and Obstet.*, April, 1910).
19. Poland (*Med. Chir. Trans.*, Vol. 52, p. 278. Quoted by Streissler).
20. Sawyer (*Quart. Bulletin North West Univ. Med. School*, March, 1910).
21. Streissler (*Ergebnisse der Chir.*, Bd. 5, p. 281, 1913).
22. Tilmann (*Deutsch. Zeitschr. fuer Chir.*, Bd. 41, p. 330, 1895).
23. Spiller and Gittings (*New York Med. Journ.*, October 6th, 1907).
24. Völker (*Beitr. zur klin. Chir.*, Bd. 21, Hft. 1, p. 201, 1908).

The true significance of a disease or anomaly is often lost sight of as a result of the fact that the vast majority of references to the subject are made in the form of case reports. That this observation holds particularly true for cervical rib may be verified by a glance at the recent excellent bibliographical summary of Streissler. This author records three hundred titles, and of the three hundred, a surprisingly large number read "A Case of Cervical Rib." By co-ordinating these various case reports, however, with the few more or less complete anatomical, embryological, neurological and physiological studies of cervical rib, we may succeed in filling in a clinical picture of unusual interest—a picture with a definitely circumscribed, local, and apparently insignificant surgical le-

sion in the foreground, intensified by a background of the broadest possible relationships with internal medicine, anatomy, neurology, orthopedics, legal medicine, and dermatology. In other words, such an investigation will show the subject of cervical rib to be a borderland study in the truest sense of the phrase.

The term cervical rib is applied to a rib-like structure jutting out from the transverse processes of any one of the seven cervical vertebrae. Usually, this rib-like process of bone is associated with the seventh cervical vertebra, with which it articulates or forms a synostosis, and from which it extends forward. This process, in order to merit the name rib, must, of necessity, be longer than a normal transverse process, and it often is shaped as a true rib, reaching to the sternum.

Streissler refers to Neubuerger's classification of the several varieties of cervical ribs as the most satisfactory.

1. The incomplete rib, not reaching to the sternum.
 - (a) Those just a little longer than the transverse process.
 - (b) Those a little longer than this, but ending free.
 - (c) Those still longer, joining with cartilage of the first rib.
2. The almost complete rib, reaching the sternum by a fusion of its costal cartilage with costal cartilage of the first rib.
3. The complete rib articulating separately with the sternum.

An extended study by Fischel demonstrated the occurrence of a cervical rib in about 1 per cent. of all the cases that came to autopsy in Prague; and clinical studies have shown that the anomaly occurs almost twice as frequently in the female as in the male sex.

The exact causation for the formation of cervical ribs has not been definitely settled. Gruber and Gegenbauer explained the anomaly on the basis of a failure of fusion between the two portions of the neural arch; but this view has been contested ever since its announcement over half a century ago. There has been such an inextricable mixture of terms, and such an abstruse argumentation based on phylogenetic and ontogenetic data as to defy the judgment of any other than a highly specialized anatomist or embryologist. The most satisfactory explanation seems to be that of Fischel, who contends that the anomaly is due to an abnormal segmentation of the proton of the skeletal axis, referable to an abnormality in the development of the mesoderm. Whether this view of Fischel be correct or not, it is at least satisfying in furnishing an explanation of many of the anomalies that occur coincidentally with the cervical rib. The same pathological stimulus that causes a variation in the mesoderm may also be active upon the other germinal layers and thus be the underlying basis for such variations as scoliosis, fissured vertebrae, and spina bifida, all of which abnormalities not infrequently accompany cervical ribs. Other anomalies reported as occurring with cervical rib, and explained on the germinal variation theory, are accessory auricles, branchiogenetic cysts (Drehmann), hare-lip (Krause), luxation of the crystalline lens (Eckstein), undescended testicle (Lauterbach), congenital club-foot (Poland), and congenital lipoma (Völker). Furthermore, there is a tendency on the part of neurologists to explain the frequency with which cervical rib occurs in neuropathic, neurasthenic and hysterical individuals, by regarding these diseases as congenital stigmata due possibly to germinal variation. Other neurologists have noted an incidence relationship between cervical rib and gliosis (Ascher), multiple sclerosis (Levi), and muscle atrophy (Spiller and Gittings).

Dismissing the moot point of etiology, we come at once upon the very

definite ground of anatomical variations caused by the presence of the extra rib, and largely responsible for the symptoms that usually develop. These variations may be grouped under three heads—muscular, vascular and neural.

Muscular.—There is an extra intercostal musculature between the cervical and the first rib, made up sometimes of the external, sometimes of the internal, and sometimes of both intercostal muscles. The scalenus anticus usually has a special insertion in the extra rib, a fact emphasized by Murphy as of importance in explaining how the subclavian artery is pressed upon.

Vascular.—The only vessels involved are the subclavian artery and vein, and even these are not disturbed in their course if the extra rib is very short. If, however, the rib reaches further forward than the subclavian groove on the first rib, then the subclavian artery is, as it were, lifted up by the extra rib so as to course over it instead of over the first rib. Such an artery is usually longer than is the normal subclavian and is more or less on the stretch. At the point where it courses over the rib the vessel is usually arched pretty sharply. The subclavian vein arches over the cervical rib only when this structure is well developed; in all other instances it courses normally over the first rib.

Neural.—When the extra rib is well developed, the cervical plexus of nerves courses over it, just as does the subclavian artery. The cords of the plexus are thus under tension, resembling, according to Kræncke, violin strings across the bridge.

Under the head of symptoms, it is important at the outset to emphasize four important facts:—

1. The vast majority of instances of cervical ribs are unaccompanied by symptoms.

2. Symptoms practically never develop until adolescence, or later in life. The reason for this is supposed to be due to the fact that, as the rib grows during adolescence or, later in life, as the cartilaginous or ligamentous attachments of the rib calcify, the subclavian artery and cervical plexus are subjected either to greater or to more constant tension.

3. Symptoms often set in after the reception of trauma, such as a blow on the neck, falls, violent use of the arm, and the use of the neck and the shoulder to support loads. Whether the onset of symptoms after trauma is due to direct injury of the vascular and nervous structures, or to a secondary inflammation, is not definitely settled; but the development of severe and protracted symptoms after trauma has served to make the subject of cervical rib very important from a medico-legal point of view.

4. The intimate relationship between cervical rib and apical pulmonary tuberculosis. This relationship is important from three different aspects—namely, etiological, diagnostic, and symptomatic. The rib limits the excursion of the apex of the lung by directly encroaching upon it at the upper thoracic aperture. Furthermore, the secondary scoliosis, which so frequently occurs with cervical rib, limits the ventilation of the lung apex, and, as a result of these limitations, tuberculosis is prone to develop. The unsuspected presence of a cervical rib interferes with supra-clavicular auscultation and percussion to a degree that not uncommonly leads to the drawing of false inferences; and, finally, the pull of a retracted tuberculous apex often precipitates symptoms of cervical rib which, previous to the retraction, had been latent. Such an instance is mentioned by Tilmann.

The cardinal symptoms are grouped, by practically all writers, under three heads: (1) Tumor, (2) vascular symptoms, (3) nerve symptoms.

By *tumor* is meant the swelling caused by the presence at the root of the neck of the rib itself, which may be so prominent as to cause marked bulging, or so small as to elude careful palpatory search. When the tumor is large, it is often possible to compress the vessel (subclavian) and make out pulsation, or to roll the nerve cords under the finger, causing radiating pains.

Vascular symptoms are frequent and occur either suddenly or develop so gradually that often the patient does not note them. They rarely occur alone, although this is possible, but are usually combined with nerve symptoms; they may be absent even when other characteristic symptoms are present. This group of symptoms is due to partial or complete, transient or permanent occlusion of artery or vein, leading to alteration of pulse, thrombosis, nutritive changes or aneurysm. By exerting counter pressure on the vessel against the rib, or on the scalenus anticus, it is often possible to feel and hear a thrill with every cardiac systole. The pulse is usually weaker on the affected side, and may even be obliterated. Sawyer has pointed out that by varying the position of arm or head, the pulse may be obliterated at will.

Whether the diminished blood volume be due to compression of the subclavian artery or to thrombus formation, it manifests itself by very definite clinical signs: paleness and coldness of the peripheral portions of the hand and fingers, alternating at times with cyanosis (if the subclavian vein be involved), numbness and various other paresthetic sensations, mild or, as reported by Murphy, pronounced ischemic paralysis, attacks of local asphyxia or syncope resembling Raynaud's disease, dry, smooth, glossy skin that desquamates markedly and fissures and cracks about the finger-tips, sub-ungual hemorrhages, and in the more severe cases actual mummification or gangrene of the fingers. One of the vascular symptoms frequently referred to is the occurrence of aneurysm of the subclavian. According to Streissler, these aneurysms do not call for a bad prognosis, for they remain stationary for a long while and often heal spontaneously by clot formation. Aneurysm formation is not common, and there is no consensus of opinion as to why it occurs. Indeed, for that matter, there does not exist a unity of opinion as to why the circulation is in any way interfered with. Naturally, pressure of the artery against the rib is an important factor, and there is the definitely developed theory (Fischer) that vascular symptoms are always due to angulation of the artery as it crosses the rib. Ehrich claims to have shown that this cannot possibly be the case, and that the artery is never under tension. Beck, however, quotes operative findings to show that, when the rib is resected, the artery drops down to its normal level, thus proving that it must have been under tension. Krausse thinks that the vessel suffers injury as a result of violent respiratory or arm movements. Gordon believes that the vascular symptoms are all due to a primary nerve lesion, which leads to secondary degeneration of the vessel wall, just as section of the sciatic is followed by degeneration in the vessels of the leg. The question as to what causes the vascular symptoms is not settled, and the reason for the great diversity of opinion that exists is that definitely similar types of cervical ribs are accompanied by marked vascular symptoms in certain individuals and by an entire absence of vascular symptoms in other individuals.

The symptoms referable to the nervous system, in contrast to those referable to the vascular system, are explained in the same way by practically all authors—namely, on the basis of repeated trauma to the cer-

vical plexus in its course over the rib, and against the scalenus articus. This agreement of opinion is probably due to the fact that some form of nerve disturbance is much more frequently encountered than symptoms referable to the vascular system.

The nerve symptoms group themselves under three heads: (1) Sensory; (2) motor; (3) vasomotor. Sometimes one group exists alone, sometimes two, and sometimes all three. There may be an intermittence of symptoms; a precipitation of them by cold, or by certain head or arm movements, and an involvement of only one nerve distribution, or of the nerve distribution over the whole arm. All the nerve symptoms manifest themselves in some portion of the distribution of the roots from the eighth cervical and the first dorsal segments.

Sensory Disturbances.—These are by long odds most common, and have been described most interestingly by Llewellys Barker in the analysis of his own case. Paresthesia and pain are the most common manifestations, and are easily brought out by pressure over the supraclavicular region. The pains are often neuralgic in character, limited to the fingers or extending from the shoulder down the arm, forearm and hand. Hypesthesia and anesthesia occur more rarely, and sometimes there is a dissociation of sensations in the finger-tips. Muscle sense may be, but seldom is, disturbed.

Under the head of motor disturbances come weakness, fatigue after slight exertion with the hand or arm, and sometimes awkwardness in the use of the hand for finer movements. Paresis of some of the muscles is common, whereas paralysis is rare. Keen records a case of *main en griffe* after paralysis of the smaller hand muscles. Muscle atrophy is common; the atrophy sometimes affecting the arm muscles, but more often the small hand muscles making up the thenar and hypothenar eminences and the lumbricals and interossei.

Under the head of vasomotor trophic symptoms, we have cold, blue or mottled extremity, with a tendency to hyperidrosis, spasms, and twitchings. But it may be readily seen how difficult it is to group these symptoms separate from those due directly to vascular disease. The trophic disturbances about the finger-tips, described under the head of vascular symptoms, frequently resemble lesions caused by syringomyelia, and often result in the patient being sent to the dermatologist for diagnosis and treatment.

Streissler has gathered together an interesting group of symptoms which are explained with difficulty but which are, nevertheless, reported in literature as accompanying cervical rib: disturbances of the sympathetic, particularly the oculopupillary fibres (ptosis, myosis, and retraction of the bulb), tachycardia or palpitation; disturbance of the phrenic with spasm of the diaphragm, and disturbance of the recurrent laryngeal nerve, with hoarseness.

The accompanying symptom of cervical rib, which has probably received more attention than any other one, is secondary scoliosis. Orthopedic surgeons, in particular, have written voluminously on the subject. The fullest monographs are those of Helbing and Meyrowitz. Here, as in practically every other branch of the subject of cervical rib, there is no unanimity of opinion regarding causative mechanism. The neurogenic theory of Hoffa, the mechanical interference theory of Garre, the reflex theory (similar to the theory that explains scoliosis after sciatica), and the congenital theory all claim recognition, and yet none of them is fully satisfactory. The scoliosis is a type that is particularly rigid, limited to

that portion of the spine between the fifth cervical and fourth dorsal vertebræ, convex toward the side of the cervical rib, accompanied by elevation of the scapula, and by a compensatory scoliosis in the region of the lower spine. The scoliosis usually manifests itself in the first half of the second decennium, or it may be delayed until puberty.

Treatment should always be conservative when possible, for operative interference is almost always essentially bound up with difficulty and often with dangers, owing to the deep situation of the rib among vitally important structures. Naturally, those cases of cervical rib which are discovered accidentally in the course of a complete physical examination, and are causing no symptoms, call for no treatment. Those cases which present mild or even moderately severe symptoms should be given the benefit of the test of conservative treatment, under which routine they often show remarkable improvement. Conservative treatment embraces complete rest for the arm, which should be maintained in a moderately elevated position, or even suspended; light massage, hot air, or warm moist or dry compresses. Galvanism and faradism have been reported as excellent adjuvants, particularly in combating pain. Antipyrine, salicylate of soda, and potassium iodide have all been recommended.

If, after testing out the above measure, the subjective symptoms persist severely, or gangrene threatens, operative treatment must be instituted. The rib may be removed through an anterior or posterior attack. The anterior approach is preferred, has been most often used, and is excellently described in the articles of Murphy, Plummer, and Streissler. Regarding operative treatment, two essential facts must be borne in mind: (*a*) Outspoken irreparable damage (aneurysm, degenerative neuritis with muscle atrophy) cannot be improved by operation; and (*b*) sometimes symptoms progress in severity despite operation.

THE RELATION OF BRONCHIAL ASTHMA TO PATHOLOGICAL CONDITIONS OF THE NOSE.

A REVIEW OF RECENT LITERATURE.

By WM. B. CHAMBERLIN, M. D., of the Editorial Staff.

1. Ballenger: Diseases of the Nose, Throat and Ear, pp. 56 and 265, 1904.
2. Bishop: Diseases of the Nose, Throat and Ear, pp. 31, 39, 51, and 59. 1904.
3. Eustis: Acute Spasmodic Asthma as Evidence of Autointoxication. (*New Orleans Med. Journ.*, p. 98, August, 1909.)
4. Francis: Asthma in Relation to the Nose. 1910.
5. Francis: Beneficial Effects of Cauterization in Bronchial Asthma. (*British Med. Journ.*, July 2nd, 1910.)
6. Grayson: Diseases of the Nose, Throat and Ear, pp. 122. 1910.
7. Grossman: Experiments as a Contribution to the Study of Nasal Asthma. (*Wien, med. Wochenschr.*, pp. 146, 214, 271, January 15th, 1910.)
8. Giffin: The Examination of the Nose and Throat in Relation to General Diagnosis. Results in Bronchial Asthma Following Nasal Operations. (*Boston Med. and Surg. Journ.*, p. 228, February 16th, 1911.)
9. Hertz: Clinical Lecture on Asthma. (*The Clinical Journ.*, p. 198, July 6th, 1910.)
10. Joy: Asthma in Relation to the Nose. (*Australasian Medical Gazette*, p. 248, May 20th, 1911.)
11. MacKenzie: Case of Boy Cured by Nasal Operation. (*Clinical Journ.*, p. 190, December, 1910.)
12. MacKenzie: Case of Asthma Improved After Nasal Operation. (*Proc. Royal Society of Med.*, Vol. 3, Part 2, p. 116.)
13. McDonald: Allbutt's System of Medicine, Vol. 4, Part 2, p. 32.
14. Matthews: The Relation of Nasal Condition to Asthma. (*Journ. Amer. Med. Assoc.*, p. 1107, September 21st, 1912.)
15. Osler: Practice of Medicine, p. 610, 1906.
16. Palleini: Nasal Obstruction—Its Varieties and Effects. (*Australasian Medical Gazette*, p. 251, May 20th, 1911.)
17. Phillips: Diseases of the Nose, Throat and Ear, p. 484, 1911.
18. Solow: Nasal Obstructions as Causative Factors in Bronchial Asthma. (*New York Med. Journ.*, p. 637, September, 1911.)
19. Thomson: Diseases of the Nose and Throat, p. 188. New York: D. Appleton and Co. 1912.
20. Yonge: Hay Fever and Paroxysmal Sneezing. London: Wm. Green and Sons. 1910.
21. Zarniko: Die Krankheiten der Nase und des Nasenrachens, pp. 160 and 584. 1910.

Although the relationship between bronchial asthma and pathological conditions of the nose has been known for over forty years, and has been proved by an abundance of clinical evidence, as well as by experimental investigation, the more recent literature contains but little of value on this subject, and the disease is given but little mention in most of the modern textbooks. In this respect the well-known work of Zarniko, in the last as well as in the previous editions, forms a most noteworthy exception; and the reader is referred to this work as containing the best résumé on the subject with which the writer has come in contact. His text is quoted freely in the following review.

Bronchial or true asthma is a disease characterized by periodic attacks of spasmodic dyspnea. As such it must be distinguished from so-called cardiac and renal asthma. Osler defines it as a "neurotic affection, characterized by hyperemia and turgescence of the mucosa of the smaller bronchial tubes and a peculiar exudate of mucin. The attacks may be due to direct irritation of the bronchial mucosa, or may be induced reflexly by irritation of the nasal mucosa and indirectly too by reflex influences, from stomach, intestines, or genital organs.

"The theories as to its cause are several: (1) That it is due to a spasm of the muscles of the smaller bronchi; (2) that it is due to a swelling of the bronchial mucosa; (3) that it is a specific form of inflammation of the smaller bronchioles—*bronchitis exudativa* (Curschmann). Other theories which may be mentioned are that the attack depends upon a spasm of the diaphragm or upon a reflex spasm of all bronchial muscles." Although himself subscribing to the second of these views, Osler is quite frank to admit that the first or spasm of the bronchial muscles theory finds the greatest number of adherents.

According to Zarniko and others, Voltolini was the first to call attention to the relationship existing between asthma and abnormal nasal conditions. As early as 1871 he reported cases of bronchial asthma as benefited or cured by the removal of masses of polypi from the nose. Since Voltolini's time his results in nasal polypi have been confirmed by numerous observers, while similar fortunate results have been obtained in septal deflections, spurs, hypertrophies, adenoids, involvement of the accessory sinuses, etc.

According to Zarniko asthma is the most striking example of a reflex nasal neurosis, while the various theories in regard to its cause all mention the fact of a spasm of some sort or other as their basis. "The concomitant secretory anomalies—*bronchiolitis exudativa*, sputum with Curschmann's spirals, eosinophile cells and Leyden crystals—are looked upon by most authors as merely secondary or accompanying symptoms. The supposed spasms are in the main traced back to irritation in the centripetal paths of the respiratory tract. Among these the nasal are by far the most important."

Thomson quotes Bosworth as saying that "a large majority, if not all cases of asthma are dependent upon some obstructive lesion in the nasal cavity." Such a view, however, would doubtless be regarded as extreme by most rhinologists. Hertz remarks that "the nasal mucosa is the most common source from which the afferent impulse, which gives rise to the bronchial spasm, comes, and Solow well adds "that many cases of bronchial asthma, with nasal obstruction, do not improve after the removal of the latter. Still this experience shall not deter us from removing the nasal obstruction in all cases coming under our observation. Experience shows that we are very often well rewarded." Grayson remarks that "no

examination of an asthma case can be regarded as complete until the nose has been thoroughly investigated." Eustis believes the asthmatic attacks to be dependent upon (1) a vulnerable area of mucous membrane, usually in the nose; (2) an external or irritating cause; (3) an abnormally sensitive nerve centre.

McDonald in Allbutt's "System of Medicine" observes that the rule, that edema with symptoms of "asthma and paroxysmal sneezing often antedates by many months the development of the neoplasm, is often overlooked in discussing its etiology and classification." Joy believes that 30 to 40 per cent. of cases of asthma, if not caused by abnormal nasal conditions, are nevertheless associated with them. He considers a majority of cases as due to hyperesthetic areas on the septum, and mentions among other causes in the order of their importance: (1) Polypi or adenoid growths; (2) hypertrophic or hyperplastic rhinitis; (3) septal or turbinal irregularities; (4) synechiæ; and (5) foreign bodies. Grossman in an interesting series of experiments on animals has shown that there are apparently two distinct reflex arcs: (1) The trifacial and the vagus, (2) the trifacial and the phrenic. He was able to reproduce experimentally, to a striking degree, the clinical picture, including the enlargement of the lungs, the lowering of the diaphragm, and the accompanying dyspnea. He concludes from his investigations that "pathological conditions act similarly to electric stimulation and that the results are only possible when the sensory stimulation has reached a certain degree."

To quote again from Zarniko: "The belief was at first prevalent that certain areas of the nasal mucosa were responsible for the asthmatic attack. That here the 'asthma points' were localized. One after another the anterior end of the inferior, then the middle turbinal (Hack), the posterior end of the inferior turbinal and the septum opposite (MacKenzie), the septum in its entire extent (Herying), inferior turbinal and anterior part of the septum (Sandmann Fliess), finally the lining of the sphenoidal sinus (Stacke and Stöckel), were designated as such zones. The divergence of the views only proved that no one of these was right. One believes to-day, with good reason, that asthmatic attacks can start from all possible points in the nose and nasopharynx."

Francis in a series of 600 cases reports 60 per cent. of cures from cauterization of the posterior part of the septum opposite the middle turbinal. "The cauterization was a light one where no obvious lesion was present." So large a percentage of cures is questioned by certain observers, while others attribute the beneficial results, not to the cauterization, but to suggestion and the marked mental impression which it caused. Out of a series of 200 asthma cases Matthews reports 184 as having the principal lesion in the nose. "One hundred and thirty-eight of this number were treated by operation, local applications in the nostrils, or by irrigation of the accessory sinuses." Reports were received from 104 of these six months after treatment. Of this number 31 were entirely relieved, 32 markedly improved, 19 slightly improved, and 22 unimproved.

Zarniko gives, as one of the most recent views on the cause of asthma, the psychoneurosis theory, which is in brief as follows: "Through imitation of the asthma type of breathing, not alone asthmatics, but also many healthy individuals as well, can voluntarily produce a condition remarkably similar to asthma, even with exudation into the bronchi. A student of Strubing's had induced this voluntary production of the asthmatic attack, so that one day on the conclusion of a bronchial catarrh he was surprised with a typical attack of asthma. Just as these attacks can be

voluntarily produced, so can they be cured, whether produced artificially or naturally, by training in the proper method of breathing."

Zarniko believes that an asthma can be considered as due to nasal origin when it is preceded or accompanied by nasal symptoms; also when it can be relieved or stopped by anesthetic or anemia-producing medicaments, such as cocaine, or adrenalin. This point is also mentioned by Ballenger. In addition to these drugs, which act upon the area from which the attacks start, there are a host of others, all of which possess decided value in certain cases. Among these may be mentioned, first of all, morphine and chloral hydrate, which act by depressing the sensibility of the central nervous system. Suggestion, as might be expected, has proved of decided value in the hands of certain clinicians. Sænger is an enthusiastic believer in the use of breathing exercises or gymnastics. By education, practice, and the fixing of the attention, the abnormal type of breathing, the short quick inspiration followed by prolonged and labored expiration, is replaced by breathing of the normal type. Atropine, from its well-known effect on the vagus endings, has proved a valuable remedy. It may be used subcutaneously, taken by mouth, used as a spray on the mucous membrane, or inhaled as smoke. Stramonium leaves, whose essential alkaloid is atropine, form the basis of most of the so-called asthma powders or cigarettes. Potassium iodide is also an old and valuable remedy. This, according to Zarniko, is the essential of the patent medicine of Hays. The other patent medicines, in which the market abounds, all contain one or more of the aforementioned drugs in varying proportions.

It is needless to remark that any operative interference should be reserved for the intervals between the asthmatic attacks. The nose should be most thoroughly examined, both normally and under the influence of cocaine and adrenalin. Abnormalities, however slight, should be most carefully corrected. Above all the nose should be most thoroughly explored for hypersensitive areas of mucous membrane. Killian emphasizes four such points—the anterior ends of the inferior turbinates and the nasal tubercula. Satisfactory and often brilliant results have often followed, in his hands, the cauterization of these points with trichloroacetic acid. The procedure is certainly a simple one and deserving of trial, as it can do no harm if not successful. No consideration of asthma could be complete without mention of the influence of climate. In this respect every asthmatic seems to be a law unto himself—one being free from asthma when in the city, another when in the country. Certain individuals are only subject to asthmatic attacks in certain localities, the underlying cause being in most cases hard to discover. Not a few cases are reported where an asthmatic attack always followed a return to the locality where the first attack was experienced. Advice in regard to the choice of an asthma-free region should be given with some reservation. In general, most asthmatics do not do well by the seashore on account of the increased humidity, while high altitudes should be avoided by those having a high degree of emphysema.

For the general therapeutic treatment the reader is referred to the various textbooks on internal medicine.

UNILATERAL RENAL HEMATURIA.

A REVIEW OF RECENT LITERATURE.

By JOHN R. CAULK, M. D., of the Editorial Staff.

1. Aynesworth: Unilateral Renal Hematuria. (*Amer. Journ. Urol.*, June, 1912.)
2. Barringer: Hematuria of Nephritis and Renal Papillitis from a Surgical Standpoint. (*Amer. Journ. Urol.*, May, 1912.)
3. Cumston: Neoplasms of the Renal Pelvis and Ureter. (*Amer. Journ. Urol.*, January, 1913.)
4. Fowler: Case of Profuse Unilateral Renal Hemorrhage. (*Amer. Journ. Urol.*, May, 1912.)
5. Kretchmer: Unilateral Kidney Hemorrhage. (*Surg. Gyn. and Obstet.*, January, 1913.)
6. Randall: The Etiology of Unilateral Renal Hematuria. (*Journ. Amer. Med. Assoc.*, January 4th, 1913.)
7. Truesdale: Unilateral Hematuria in Chronic Nephritis. (*Boston Med. and Surg. Journ.*, January 30th, 1913.)
8. Schenck: Concerning So-called Essential Hematuria, with Special Reference to the Hematuria Accompanying Mild Grades of Nephritis. (*Surg., Gyn. and Obstet.*, July, 1911.)

The literature of recent date is quite voluminous on the subject of unilateral renal hematuria, bearing special reference to the so-called essential hematuria. The majority of authors are in accord in proclaiming it a term which should be stricken from our nomenclature forever. In the early days of renal surgery, before the development of the cystoscope, ureter catheter, shadowgraph catheter, x-ray, pyelography, and tests for renal efficiency, it was often necessary to label certain renal bleedings by this term; but since the above improvements have been in vogue, it is seldom, if ever, that a definite pathological foundation is lacking to explain the source of hemorrhage.

The numerous lesions which have been found to explain some of these hemorrhages of unknown cause have been varicosities of the renal pelvis, papillitis, pelvic erosions and tumors, nephritis and renal infections. Nephritis, as a cause of the bleeding, has been brought to the foreground recently. Keersmaker was the first to call attention to nephritis as a factor in the production of unilateral renal hematuria. He did a nephrectomy for unilateral renal bleeding, and the sections showed chronic interstitial nephritis. He stated that many of the so-called essential hematurias could be explained by this disease, if the kidney had been carefully examined. Albarran was the first to substantiate him.

Klemperer, Schade, and Senator still believe in the theory of essential hematuria. Fowler recently recorded a case in which a nephrectomy was

done for unilateral bleeding and a thorough examination of the removed kidney failed to show an adequate cause for the bleeding. Randall lays great stress on renal congestion as the cause of unilateral bleeding, and believes that in many cases nephritis *per se* cannot explain the hemorrhage; he thinks there must be some intrinsic or extrinsic factor which, by producing renal congestion, is responsible for the bleeding.

The ordinary cause of unilateral renal hematuria such as tuberculosis, stone, neoplasm and hydronephrosis, will not be considered in this abstract.

In the hematuria secondary to nephritis, the kidneys have generally shown a chronic interstitial involvement. Kretschmer in his paper reports 130 cases, 62 of which had had a microscopical examination; 53 of these showed various nephritic changes. He states that the more carefully these cases are studied, the fewer will be the cases of essential hematuria that will appear in the future.

Another cause of unilateral bleeding is that due to bacterial infection, particularly colon bacillus. Billings reports 2 cases of this type, both of which were cured of bleeding by the injection of colon vaccines. Elliott also believes that the colon bacillus can induce a painless hematuria, and he reports a case of toxic hematuria. White also coincides with this view.

Guadiani concludes that hemorrhagic nephralgias are always called forth by some severe lesions of the kidney and are cases of so-called unilateral nephritis. He states further that many of these lesions are the result of bacterial invasion of the kidney. There are numerous authorities who favor the inflammatory and the nephritic origin of hematuria. Among them may be mentioned Golling, Lane, Motz, Schenck, Katzenburg, and Zimmer. Many of these authors offer a word of warning to the clinician, which is, that one must not conclude, in the absence of albumin and casts, that the bleeding which may be present is not due to a nephritis, as many of the cases pathologically show marked evidences of nephritis without such clinical manifestations in the urine. Another point to be remembered is that even though there is bleeding from one kidney only, this is no evidence of the fact that the other kidney may not show marked alterations, for often with two kidneys equally diseased by the same pathological process only one may cause bleeding.

The lesions of the renal pelvis, which have been found associated with hematuria, have been described by Cabot, McGowan, Peterkin, Pilcher, Zimmer, von Frisch and others.

Pilcher, McGowan and Cabot found in their cases varicosities of the papillæ. Zimmer believes strongly in the vessel changes in the pyramids, as a factor in bleeding. Von Frisch found a pyelitis granulosa as a cause of bleeding in one of his cases. Another cause of the bleeding from the pelvis is to be found in neoplasms. Neoplasms of the renal pelvis and ureter are not common. Richter, in 1909, collected 10 cases, and Cumston gives a brief survey of the question in his article. The most common tumors of the renal pelvis are the epithelial tumors. These are divided into three types: papilloma, papillary epithelioma, and epithelioma. Other less common tumors are the various varieties of sarcomas.

The differential diagnosis in these cases of unilateral bleeding, which heretofore have been called idiopathic or essential hematurias, is often very difficult and extremely interesting from the fact that many cases of nephritis may show no clinical evidences of the lesion; and, on the other

hand, there are cases of bleeding from the renal pelvis which may occur in the association of various degrees of nephritis. Every available method should be utilized in differentiating between the different diseases on this account, because the treatment of the lesions of the pelvis and of the kidney is entirely different in many cases. Most of the authors advocate decapsulation for the relief of stubborn hematurias from nephritis, and, if this is not sufficient, nephrectomy. For the lesions of the renal pelvis, such as papillary varicosities, erosions, etc., such treatment, as pelvic injection of adrenalin and various sera, may be all that is necessary.

DIAGNOSTIC AND THERAPEUTIC NOTES.

HERPES ZOSTER AND VARICELLA.—Hein (*Berl. klin. Wochenschr.*, No. 50, 1912). The eruption of chickenpox may exceptionally take on the typical characteristics of a herpes zoster. Hein reports such a case. A woman was taken ill with herpes zoster. Ten days later, her child became ill with varicella, and a second child, who had been away from home until four days after the beginning of the mother's illness, took sick with varicella twelve days after its arrival. As the second child's illness began only six days after that of the first, both infections must have been derived from the mother. The diagnosis in such cases is possible only on the basis of their infectiousness.

UNEQUAL PUPILS IN HEMIPLEGIA.—Klippel and Weil (*Sem. méd.*, No. 46, 1912). In hemiplegia with coma, the wider pupil is on the side of the cerebral lesion, and therefore on the side opposite to that of the paralysis. In hemiplegia without coma, on the other hand, these relations are reversed. The writers have observed this phenomenon, without exception, in a large number of such cases. They find that the disappearance of this inequality of the pupils often indicates a bad prognosis.

DIFFERENTIAL DIAGNOSIS BETWEEN ASCITES AND FLACCID OVARIAN CYSTS.—Dienst (*Muench. med. Wochenschr.*, No. 50, 1912). It is sometimes difficult to distinguish between ascites and flaccid ovarian cysts, both by means of physical examination and examination of the fluid. The writer advocates the following test: If a saturated solution of sodium chloride is added to ascitic fluid, a flocculent precipitate results, due to fibrinogen. This precipitate is never observed in the contents of ovarian cysts, as it does not contain fibrinogen.

ALCOHOLIC DELIRIUM.—Fuerer (*Berl. klin. Wochenschr.*, No. 51, 1912). The belief, that in chronic alcoholism the sudden and complete withdrawal of alcohol may lead to an attack of delirium tremens, is still widespread. The writer is convinced that this is an error. When it seems to occur, the fact always is that the delirium has set in before the withdrawal of the alcohol, and the appearance, to the contrary, is due to the ability of many such patients to conceal their condition for several days after its onset. In every case of chronic alcoholism the immediate and rigid withdrawal of alcohol is indicated.

DIPHThERIA BACILLI IN THE URINE.—Koch (*Deutsch. med. Wochenschr.*, No. 50, 1912). Out of 26 cases of diphtheria, 2 showed the presence of virulent diphtheria bacilli in the urine. It is therefore important, in such cases, to treat the urine as a possible source of contagion.

SALVARSAN IN PERNICIOUS ANEMIA.—Hobhouse (*Brit. Med. Journ.*, December 14th, 1912). Hobhouse adds one more to the cases already reported of a favorable influence of salvarsan upon pernicious anemia. His patient showed the typical picture of the disease, with 800,000 red cells and 18 per cent. hemoglobin. After two injections of 0.3 gm. salvarsan, at two weeks' interval, a steady improvement set in. Six months later, the red blood count was 4,700,000 and the hemoglobin 110 per cent. He prefers the intramuscular to the intravenous route, believing that the former leads to a more prolonged action of the drug.

CHEMOTHERAPY OF PNEUMONIA.—Engwer (*Zeitschr. fuer Hyg.*, No. 2, 1912). The time may not be far away when pneumonia and allied affections will yield to a specific medicinal agent. In mice and guinea-pigs, Engwer has obtained notable results with acthyl-hydrocuprein, a substance related to hydrochinin. A considerable proportion of the animals inoculated with pneumococci survived if subsequently treated with this substance. The less severe the infection, the greater the proportion of the recoveries. The untreated controls all died, the pneumococcus being far more virulent for these animals than for man. The results were especially favorable if pneumococcus immune serum was given at the same time. The action of the drug consists not in the production of a leucocytosis, but in an extra-cellular destruction of the parasites. The treatment is not yet ripe for use in human beings, but it points the way to more decisive results. Levy (*Berl. klin. Wochenschr.*, No. 53, 1912) has obtained similar results in the streptococcus septicemia of mice. It seems as though we would hear more of this drug.

GASTRIC ULCER AND GASTRO-ENTEROSTOMY.—Kocher (*Archiv fuer klin. Chir.*, Vol. 99, No. 2, 1912). At the operation, the experienced surgeon can almost always distinguish between ulcer and cancer. A cancer is probably present if the tumor, even though small, is irregular, or if the ulcer cannot be distinctly felt, or if it is flat and spread out. Before operation, Gluzinski's reaction is of value. An ulcer may be diagnosed if an increase in the quantity of the test-meal is followed by an increase of the free hydrochloric acid or, at least, by a marked diminution of the hydrochloric acid deficit. In cancer, on the other hand, an increase in the quantity of the test meal is followed by a diminution of the free hydrochloric acid or by an increase of the hydrochloric acid deficit.

In 80 cases of florid gastric ulcer, a gastro-enterostomy resulted in complete cure in 78.5 per cent. of cases, in satisfactory improvement in 15.5 per cent., and in no improvement in 6 per cent. The gastro-enterostomy should be done at the lowest point of the greater curvature.

There results then not only a continuous drainage of the stomach, but a diminution of the gastric acidity, on account of the inflow of bile and pancreatic juice. This puts the ulcer in the best situation for spontaneous healing.

INTRACTABLE HEMORRHAGE IN INFANTS.—Bluehdorn (*Berl. klin. Wochenschr.*, No. 1, 1913). In 3 cases of so-called intractable hemorrhage in young infants, the writer has obtained a cessation of the bleeding by means of the administration of calcium chloride and the simultaneous injection of diphtheria antitoxin. The method deserves a trial in this desperate condition. It is probable that the antitoxin acts rather in its capacity as a foreign serum than by virtue of its antitoxic power.

SYPHILIS AND MARRIAGE.—Hoffmann (*Deutsch. med. Wochenschr.*, No. 1, 1913). The recent great advances in our knowledge of syphilis have not resulted in any change in our attitude towards the relationship of this infection to the right to marry. This great syphilographer maintains that a syphilitic who has gone through two or three energetic courses of treatment with mercury and salvarsan, and in whom there have been no syphilitic manifestations for two years, may safely marry, provided three to five years have elapsed since the date of infection. It is possible that, since the advent of salvarsan, this last interval may be somewhat reduced. He believes that a positive Wassermann reaction, alone, need not act as a bar.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

In the course of my letter, printed in the JOURNAL for January last, some allusion was made to the researches of Much, on the life history of the tubercle bacillus; and I suggested the probable recognition, in the near future, of the views at present held by only a few as to its essentially polymorphic character. Those who are interested in the subject—and who is there that should not be?—may care to know that Dr. Ronald Krohn has recently translated, for the benefit of English readers, Koehler's "Annual Report on Tuberculosis Research for 1911." In this volume, which has only just issued from the press, there is much valuable and little known information, but, in particular, there is an admirable statement of Much's work, and a clear account of the not acid-fast forms of the organism recognized by him—the granular rods, the isolated granules, and the rarer 'solid' rods. By something in the nature of a coincidence, too, the January number of the *Revue de Médecine* is largely occupied with an important memoir, written by Ferran, of Barcelona, who not only claims that he has, independently, succeeded in demonstrating the polymorphic character of the tubercle bacillus, but that he has actually, in cultures, converted one form into the others. Moreover, he has extended his work in the direction of associating different classes of clinical tuberculosis with different phases in the life-cycle of the organism.

In attempting to appreciate the investigations of Much and Ferran, we should not forget that, many years ago, Cornet demonstrated the presence, in the caseous material from tuberculous joints, of spherical bodies that were generally assumed to be products of the degeneration or disintegration of tubercle bacilli. But it now seems pretty clear that Cornet's bodies were really the granular forms of the organism, and that we must, in respect of the *B. tuberculosis*, reckon with a life-cycle as complicated as that of the tenia echinococcus, or the plasmodium malariae. Perhaps, too, we are now within measurable distance of escaping from the fog that has, for so many years, obscured our comprehension of the relations between scrofula and tuberculosis, and, it may well be, that Poncet's clinical observations are about to obtain justification at the hands of the bacteriologists.

During the week that has just passed, Dr. A. Keith, the learned and ingenious conservator of the Museum of the Royal College of Surgeons in London, has delivered the initial lectures of a course dealing with the upright posture and its consequences. Dr. Keith is equally master of medical science, of anthropology and of comparative anatomy, and there

is no one more competent than he to illuminate the subject. A point insisted on by him is that posture is an exceedingly complex functional expression, and that such conditions as flat-foot and scoliosis are, therefore, manifestations of something much more than merely anatomical states or relations, depending as they do on disturbances, not only of the equipoise between delicately balanced muscles, but of nerve-impulses and groupings. Nor is the erect posture, as we are too apt to think, a characteristic of man alone. It was acquired, many thousands of years ago, by our progenitor when in that stage of evolution represented to-day by the surviving gibbons: apes lower in the scale than the gorilla and the chimpanzee. But, although the gibbons of to-day, like those which were ancestral for us, have abandoned the pronograde, or 'all-fours' position, their method of propulsion is not human, and depends on the use of the arms for swinging and balancing. By the gorilla and the chimpanzee, the gibbon's method of propulsion has in its turn been abandoned; and the practice of walking, with the aid of the arms, has been adopted. Man, however, walks without the aid of his arms, and plants his feet squarely on the ground. His difference from the apes is not then found in the assumption of a posture so much as in the assumption of a new method of progression—a dynamic and not a static feature. Yet posture itself is, for us, an active, or dynamic function, and not one that is purely passive, mechanical, or static.

Prof. Keith, in his fascinating way, traced lucidly the changes in the arrangement of the muscles of the pelvic floor, recited in the transition from the pronograde stage to the human, and enquired how it is that, since the erect position was so attained long before man came on the scene, the evil consequences of the upright posture—hernia, prolapsus uteri and the like—do not occur in apes, but are reserved for civilized man and woman. There are several answers to this question, but, in a happy phrase, the lecturer embodied a notion that perhaps will be welcomed by some sociologists. "Work," he says, "is unevenly distributed." There are those who work too little, and those who work too much. Those who work too little, suffer by reason of the fact that their postural muscles atrophy, and the nerve-processes fall into abeyance; those who work too much, suffer from exhaustion of the same nerve and muscle groups. The muscles of the pelvic floor are, indeed, postural; in our pronograde ancestors they were arranged in a certain way, so as to prevent the expulsion, through the pelvic outlet which then had a horizontal axis, of the abdominal organs which, normally resting on the convex sheet of abdominal muscles, during jumping or springing, were, by contraction of this sheet, forced outwards, horizontally. But in human beings of to-day, things are differently arranged; abdominal organs have become pelvic, and the pelvic floor has not only, now that the axis of the outlet has become vertical, to guard against the effects of gravity, but to counteract the forcing downwards of the viscera when the intra-abdominal pressure rises, as in bending laboriously over the wash-tub. In the course of these changes, muscles which once passed to the tail have become attached to the rectum, and their caudal ancestry is still signified by the continued presence of fibrous and ligamentous structures attached to the human coccyx. The tail was virtually lost when the first gibbon stood upright, for then the tail, as a place of attachment for certain muscles was no longer needed.

There is always some stimulating thought to be carried away from the lecture theatre of the College of Surgeons, and perhaps Prof. Keith

has sounded the keynote of a new revolution. The greatest happiness, or the greatest health of the greatest number is to be secured by the redistribution, not of wealth, but of muscular work!

These lectures will be continued, and I will refer to them again; but I ought not to omit allusion to the Hunterian Oration annually given in honor of John Hunter, and this year delivered by the President, Sir Rickman J. Godlee, not only in honor of Hunter, but in praise of Lord Lister. The oration is published in full, in the *Lancet* for February 22nd. The problem for us, said the orator, taking John Hunter and Lister for his examples, is not simply how to keep alive, but how to live well.

March 10th.

PRACTICAL MEMORANDA.

By WM. T. COUGHLIN, M. D., of St. Louis.

The best method for the removal of needles, thorns, and such foreign bodies buried in the tissues, according to Blair, of St. Louis, is that of raising a flap which has for its centre the supposed site of the needle, etc. The part is rendered ischemic and an anesthetic, either local or general, is employed. The skin and superficial fascia are first raised and failing to find the foreign body, the deeper structures are raised, layer by layer, until the body is encountered.

Diarrhea after gastro-enterostomy is best treated by limiting the meats and by having the patient lie down for a short while after each meal.

In radiographic examination for fetus in utero in the early months or in the presence of fibromyomata, it is as necessary to purge and clyster as it is in examining for renal calculi.

Beurmann, Mouneyrat, and Ténon have made experimental and clinical studies with two new arsenical preparations called 1116 and 1151, and find that the results obtained by their administration in syphilis are as good as those obtained by salvarsan, while they possess none of the disadvantages of the latter. They are administered either intravenously or intramuscularly.

Neosalvarsan is said to have given good results in a case of Paget's disease of the bones.

Are American physicians doing anything in the revival of the treatment of tuberculosis of the lungs by induced pneumothorax? It seems to have been talked of and even tried more than ten years ago. Lately we have heard little of it. It is receiving considerable attention at present in England and France.

In 7 cases of Dupuytren's contraction treated with thyroid extract, by M. Leopold Levi, 5 were cured.

Pech gives the following simple cure for nose-bleed. Have the patient stand erect with the head up and place the finger on the nostril that does not bleed so as to keep it closed. Patient then slowly inhales through the bleeding nostril and exhales through the mouth. This, continued for a

few minutes, will check the bleeding. Avoid blowing the nose or using the handkerchief lest the clots be loosened.

Kirmisson advocates, while operating on epigastric hernia (hernia of the linea alba), the examination of the stomach and duodenum for ulcer, as this often is co-existent with such hernias.

For pruritis ani when there are lesions, Sabouraud uses an ointment made of equal parts of pine tar and cocoa butter, or lanoline and pine tar. Where, however, there are visible lesions the proportion of the tar must be diminished as in the following prescription:—

R Lanolin.
Liquid tar (maritime pine).....ana 5 gm.
Oxide of Zinc..... 7 gm.
Vaseline.20 gm.

Apply two or three times daily, or as required.

Stovaine may be combined with the ointment. When all applications fail try the *x*-ray.

Again we see a contemporary advocating a special operation with flaps and the rest of it for cancer of the breast with removal of the regional glands. The additional trauma with its increased shock and increased length of time is for the purpose of preventing later swelling of the arm and to enable the patient to have increased range of motion. Both these objects will be best attained if the arm is dressed in the Treves position after the ordinary operation.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The March meeting of the St. Louis Medical Science Club was held at the Barnard (Free) Skin and Cancer Hospital, March 11th, at 8:15 p. m. The following program was given:—

1. A New Endoglobular Parasite in an Invertebrate Host.
.....J. F. Abbott
2. A Comparative Study of the Structure and Proliferative Power
of Pigeon and Guinea-Pig Skin. .
.....Leo Loeb and W. H. F. Addison
3. On the Specificity of Precipitins Formed After Injection of
Isolated Proteins.....Philip A. Shaffer

(Signed) MOYER S. FLEISHER, *Secretary*.

A NEW ENDOGLOBULAR PARASITE IN AN INVERTEBRATE HOST.

By J. F. ABBOTT, M. D., of St. Louis.

In studying the blood of *Thalassasma mellita*, a worm in which hemoglobin is carried in the blood by nucleated corpuscles analogous to erythrocytes, about twenty-five per cent. of the individuals examined were found to be parasitized by a species of *Hæmogregarina*. The trophozoite is first found in the cytoplasm of the hematid at whose expense it grows and from which it finally emerges by rupture of the wall of the blood-cell. Association stages are found in the hemolymph, and evidence is at hand that an isogamous conjugation takes place and that the resulting zygote reenters another corpuscle where sporulation takes place. Further details are at present lacking. This cycle is substantially similar to what was claimed for other hemosporidians by Labbé, but which have been somewhat discredited by Hintze, Minchin and others. This is the first record of the occurrence of a hemosporidian in an invertebrate host (excluding the sexual phase of the forms—*Plasmodium malariae* and others—which pass through the mosquito, in which case the latter is not a true secondary host). It is an interesting speculation whether there is any relation between the presence of hemoglobin in the free corpuscles and the presence of parasites of this sort, *Thalassasma* being one of the few invertebrates in which such corpuscles occur.

A COMPARATIVE STUDY OF THE STRUCTURE AND PROLIFERATIVE POWER OF PIGEON AND GUINEA-PIG SKIN.

By LEO LOEB, M. D., AND W. H. F. ADDISON, M. D., of St. Louis.

The aim of our investigation was to establish any possible relation between the structure of the skin of various species and the physiological reaction of the epithelial cells to growth stimuli. The epidermis of the pigeon consists of a distinctly smaller number of cell layers than the epidermis of the guinea-pig. Correspondingly we find that the cell proliferation under normal conditions is considerably less marked in the cells of the epidermis of the pigeon than in the cells of the epidermis of the guinea-pig. This diminished power to proliferate is in all probability the cause of the difference in the structure of the two skins. We also find that artificial growth stimuli, as those called forth during wound healing, cause a more marked cell proliferation in the guinea-pig than in the pigeon. We may, therefore, conclude that the epidermis of the guinea-pig has a greater power to proliferate than the epidermis of the pigeon, and that this difference of the power to proliferate is the cause for the difference in the structure of the two skins.

ON THE SPECIFICITY OF PRECIPITINS FORMED AFTER INJECTION OF ISOLATED PROTEINS.

By PHILIP A. SHAFFER, M. D., of St. Louis.

Nucleoproteins, globulins and albumins isolated from livers and kidneys of dogs, and purified by repeated solution and reprecipitation, were injected into rabbits. The resulting rabbit sera, immune to the respective liver or kidney nucleoprotein or globulin and albumin, were tested by the precipitin reaction against nucleoproteins, globulins and albumins of dog liver, kidney, lung, pancreas, and blood-serum.

The results indicate that liver and kidney nucleoproteins give rise to precipitins which have a relatively high organ specificity—that is, the reactions are marked with the particular antigen and but very slight with nucleoproteins or with globulins and albumins from other organs. This result confirms in general the findings of Bierry and collaborators,* and of Beebe,** and is contrary to the work of Pearce and Jackson,† and of Pearce, Karsner and Eisenbrey.‡

The sera, immune to liver or kidney globulin and albumin, on the other hand, react strongly with the globulins and albumins of other organs and with blood-serum; they, therefore, show no organ specificity.

**Comp. Rend. Soc. de Biol.*, Vol. LV, p. 476, 1903; *ibid.* Vol. LVI, p. 238, 1904; *ibid.* Vol. LXIII, p. 496, 1907; *ibid.* Vol. LVI, p. 1016, 1904.

***Journ. Exper. Med.*, Vol. VII, p. 733, 1905; *Trans. Congr. Amer. Physicians and Surgeons*, Vol. VIII, p. 36, 1910.

†*Journ. Infect. Dis.*, Vol. III, p. 742, 1906.

‡*Journ. Exper. Med.*, p. 44, 1911.

BOOK REVIEWS.

ARTERIOSCLEROSIS. Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis, and Treatment. With a Special Chapter on Blood Pressure. By Louis M. Warfield, A. B., M. D., Assistant Superintendent and Resident Physician to Milwaukee County Hospital, etc. etc. With an Introduction by W. S. Thayer, M. D., Professor of Clinical Medicine, Johns Hopkins University. Illustrated with Twenty-eight Engravings. St. Louis: C. V. Mosby Co. 1912. Price, \$2.50.

Dr. Warfield's presentation of the subject is the ideal one from the point of view of the busy practitioner. No attempt is made to treat the subject exhaustively nor to discuss the pros and cons of disputed matters. On the other hand, such information regarding arteriosclerosis—its pathology, diagnosis and treatment—as is of practical utility to the physician, is presented with brevity, clarity and yet with all necessary completeness.

Arteriosclerosis can scarcely be considered apart from blood-pressure, and in the view expressed by Dr. Warfield with which some may not concur, high tension is considered to be a large factor in the production of arteriosclerosis. As the data on blood-pressure have increased, the importance of it has become more evident. The chapter on "Blood-Pressure" has been wholly rewritten, expanded so as to give a comprehensive grasp of the essential features, and several illustrations have been added in order to elucidate the text more fully. The chief objects in view were to make clear to the physician the technique and the necessity for estimating both systolic and diastolic pressures.

The make-up of the book is excellent, although it may be questioned whether a smaller and handier volume, containing the same text on thinner paper, would not have been more convenient.

AIDS TO TROPICAL HYGIENE. By Major R. J. Blackham, D. P. H. (Lond.), R. A. M. C., Knight of Grace of the Order of St. John of the Middle Temple, Barrister-at-Law, etc. etc. New York: William Wood and Company. 1911. Price, \$1.25.

This small volume of 192 pages is uniform with the "Aids to Tropical Medicine" by Brooke, and discusses briefly such subjects as climate, air, water, foods, clothing, soils, refuse disposal, insects and disease, animal parasites, and disinfection. There is a special chapter on malaria, and two appendices, one on the prevention of various tropical diseases and the other on the more important species of flies. A short list of references is also given. A fairly good index completes the volume.

If any criticism is to be offered on this useful little work it is that the book might almost be termed a treatise on general hygiene rather than one on tropical hygiene. The chapter on insects and disease, while of interest and value, could have been improved by care in the use of nomenclature. The same may be said of the chapter on animal parasites. The chapter dealing with the special measures for the prevention of malaria is excellent.

The volume is one that might well be tucked into the luggage of anyone proceeding to the tropics. If such a brief résumé of tropical hygiene were read by each intending visitor or resident of warm countries on his voyage out, we would have fewer needless deaths among new arrivals in the tropics.

THE PRACTITIONER'S ENCYCLOPAEDIA OF MEDICINE AND SURGERY IN ALL THEIR BRANCHES. Edited by J. Keogh Murphy, M. C. (Cantab), F. R. C. S., Surgeon, Miller General Hospital for South-East London, Senior Assistant Surgeon to Paddington Green Children's Hospital. New York: Oxford University Press. 1912.

The entire field of medicine and surgery is covered in one volume. Each portion of the subject is written by some one who has paid special attention to it, often by an acknowledged master in that field. Among the eminent contributors we may mention Osler, Horder, Ker, Handley, Lea and the like. From

the nature of the case, the contributions are very uneven and the reader will be alternately delighted and chagrined. Curious slips are met with from time to time, as when Williams states that "so far attempts at estimating the diastolic pressure have been unsuccessful." On the whole, however, the standard of excellence is very high, and the possessor of the volume will with rare exception be glad of its acquisition. Unfortunately, a few years will doubtless find most of the book hopelessly out of date.

FIRST-YEAR NURSING. A Text-Book for Pupils During Their First Year of Hospital Work. By Minnie Goodnow, R. N., Formerly Superintendent of the Woman's Hospital, Denver, Directress of Nurses of Milwaukee County Hospital, Superintendent of Bronson Hospital, Kalamazoo. Illustrated. Philadelphia: W. B. Saunders Company. 1912. Price, \$1.50.

This work is intended to serve as a book which should be a companion volume to Miss Charlotte Aiken's "Primary Studies for Nurses," which is now in use in a large number of training schools. Effort has been made to have it fit in with that work, repeating little if anything which it contains, and then only when experience has shown that repetition for the sake of emphasis is desirable.

It is not designed to be a complete textbook of nursing, the more advanced work being purposely omitted, so that the work of the first year may be clearly defined. No attempt has been made to give any suggestions for use in district or private nursing. The nurse in her first year of hospital training is the one for whom the book is designed.

MANUAL OF SURGERY. By Alexis Thomson, F. R. C. S. Ed., Professor of Surgery, University of Edinburgh; Surgeon Edinburgh Royal Infirmary, and Alexander Miles, F. R. C. S. Ed., Surgeon Edinburgh Royal Infirmary. Volume First—General Surgery. Volume Second—Regional Surgery. Volume Third—Operative Surgery. With 220 Illustrations. New York: Oxford University Press. 1912.

This manual appears in the fourth edition of the first two volumes and the first edition of the last volume. We have commented favorably on the former editions of this work, and have noticed each edition becoming more valuable as additions and revisions have been made. The present completed work makes an excellent manual for practitioners and students, although there is no advantage in having the operative treatment separated from the body of the discussion of the various diseased conditions. However, this third volume on "Operative Surgery" is fairly complete and the measures considered are well described. The illustrations are good.

MANUAL OF CHEMISTRY. A Guide to Lectures and Laboratory Work for Beginners in Chemistry. A Text-Book Specially Adapted for Students of Medicine, Pharmacy, and Dentistry. By W. Simon, Ph. D., M. D., Professor of Chemistry in the College of Physicians and Surgeons of Baltimore, and in the Baltimore College of Dental Surgery, etc. etc. and Daniel Base, Ph. D., Professor of Chemistry in the Maryland College of Pharmacy, Department of the University of Maryland, etc. etc. Tenth Edition, Thoroughly Revised. With Eighty-two Illustrations, One Colored Spectra Plate, and Eight Colored Plates Representing Sixty-four Chemical Reactions. Philadelphia: Lea and Febiger. 1912.

This is a useful presentation of the subject with special reference to the needs of the medical student. After a couple of chapters upon the fundamental laws of chemistry and physics, the elements first of inorganic and then of organic chemistry are discussed. A chapter on physiological chemistry concludes the volume. While primarily intended as a school textbook, the volume will be found useful for reference by the practitioner.

THE DISEASES OF THE SKIN. By Willmott Evans, M. D., B. S., B. Sc., F. R. C. S., Surgeon to the Royal Free Hospital, and Surgeon to the Skin Department, Royal Free Hospital, etc. etc. With Thirty-two Illustrations. New York: Oxford University Press. 1913. Price, \$3.75.

The nomenclature of dermatology is always too complex and confusing, not only to those who devote most of their time to the study of the subject, but especially to those who practise general medicine. This little book of Willmott Evans is an effort at a plain, intelligent exposition of diseases of the skin and not a jumble of meaningless adjectives and words. It is clearly written in plain unadorned English.

FRANKLIN'S CONTRIBUTION TO MEDICINE. Being a Collection of Letters Written by Benjamin Franklin bearing on the Science and Art of Medicine and exhibiting his Social and Professional Intercourse with Various Physicians of Europe and America. By Theodore Diller. Brooklyn: Albert T. Huntington. 1912. Price, \$2.00.

One is apt to forget what an important rôle Benjamin Franklin played in the life of his times, and one is also apt not to realize how much influence his writings and his personality had upon the medicine of his period.

This work sets forth, in a most attractive manner, the various accomplishments and attainments of Franklin, and gives a very interesting account of his correspondence and intercourse with the principal men in medicine during the latter part of the eighteenth century with whom he came into close relationship.

The volume is most interesting, is well written and well printed.

A CLINICAL MANUAL OF THE MALFORMATIONS AND CONGENITAL DISEASES OF THE FOETUS. By Professor Dr. R. Birnbaum, Chief Physician to the University Clinic for Women at Goettingen. Translated and Annotated by G. Blacker, M. D., B. S., F. R. C. P., F. R. C. S., Obstetric Physician to University College Hospital and the Great Northern Central Hospital, etc. etc. With 58 Illustrations in the Text, and 8 Plates. Philadelphia: P. Blakiston's Son and Co. 1912. 7s.

There is no other book in the English language, which covers, in a similar manner, the field of the malformations and congenital diseases of the fetus. It was this very consideration which induced Dr. Blacker to prepare this English translation of the German original. It must, however, be emphasized that Dr. Blacker was not content with the preparation of a mere translation, but has added a large number of explanatory notes containing much additional information, thus increasing materially the usefulness of the book.

PATHOLOGY AND TREATMENT OF DISEASES OF WOMEN. Fourth Edition, Rewritten by A. Martin, Professor und Direktor der Universitaets-Frauenklinik in Greifswald, and Ph. Jung, Professor und Oberarzt der Universitaets-Frauenklinik in Greifswald. Only Authorized English Translation, Written and Edited by Henry Schmitz, M. D., Professor of Gynecology, Chicago College of Medicine and Surgery; Medical Department, Valparaiso University, etc. etc. With One Hundred and Eighty-seven Illustrations, Twenty-five of which are in Colors. New York: Rebman Company. 1912. Price, \$5.00.

This new volume on gynecology exhibits two distinct and characteristic features: clearness and terseness of diction, and excellent illustrations especially of histological findings. It ranks among the most popular texts on gynecology in German universities and deserves the careful attention of teachers in American medical schools.

MATERIA MEDICA AND THERAPEUTICS. Including Pharmacy and Pharmacology. By Reynold Webb Wilcox, M. A., M. D., LL. D., Professor of Medicine (Retired) at the New York Post-Graduate Medical School and Hospital; Consulting Physician to St. Mark's and to the Nassau Hospitals, etc. etc. Eighth Edition, Revised. With Index of Symptoms and Diseases. Philadelphia: P. Blakiston's Son and Co. 1912. Price, \$3.00.

This, the eighth edition of Wilcox's well-known textbook, is characterized by increased condensation and great clarity. The great expansion of the field of pharmacology has led to the division of the book into two parts, the former covering the field of materia medica and prescription writing, the latter that of pharmacology proper. In neither department does the treatment of the subject approach exhaustiveness. For ready reference, however, the busy practitioner may well find the book useful.

A TEXT-BOOK OF GENERAL BACTERIOLOGY. By Edwin O. Jordan, Ph. D., Professor of Bacteriology in the University of Chicago and Rush Medical College. Fully Illustrated. Third Edition, Thoroughly Revised. Philadelphia: W. B. Saunders Company. 1912. Price, \$3.00.

When a textbook goes through three editions in four years its popularity is evident. In the case of Jordan's "Bacteriology" this popularity is well deserved. The reader will find in it an accurate presentation of the subject and one as complete as is requisite for any but the professional bacteriologist. The book is one of the very best presentations of the subject in the English language.

A TEXT-BOOK ON THE PRACTICE OF GYNECOLOGY. For Practitioners and Students. By William Easterly Ashton, M. D., LL. D., Fellow of the American Gynecological Society; Professor of Gynecology in the Medico-Chirurgical Hospital, Philadelphia, etc. etc. With Ten Hundred and Fifty New Line Drawings Illustrating the Text by John V. Alteneder. Fifth Edition, Thoroughly Revised. Philadelphia: W. B. Saunders. 1912. Price: Cloth, \$6.50; Half-Morocco, \$8.00.

The latest edition contains much new material especially in relation to newer methods of conservative and operative treatment. Also recent discoveries in the field of histopathology and serology are properly considered as far as they have advanced our knowledge in the field of gynecology. The volume at present comprises 1100 pages and contains 1050 illustrations.

FURTHER RESEARCHES INTO INDUCED CELL-REPRODUCTION AND CANCER. Vol. II. Consisting of Papers by H. C. Ross, M. R. C. S. Eng., L. R. C. P. Lond., J. W. Cropper, M. B., M. Sc. Liverpool, M. R. C. S. Eng., L. R. C. P. Lond., and E. H. Ross, M. R. C. S. Eng., L. R. C. P. Lond. With Illustrations. The John Howard McFadden Researches. Philadelphia: P. Blakiston's Son and Co. 1912. Price, \$1.00.

We find no reasons in Volume II of "Further Researches" for changing our views expressed when reviewing Volume I. The story is interesting enough, but the contention remains unproved.

BAKTERIOLOGISCHES TASCHENBUCH. Die Wichtigsten technischen Vorschriften zur Bakteriologischen Laboratoriumsarbeit. Von Dr. Rudolf Abel, Geheimem Ober-Medizinalrat in Berlin. Sechzehnte Auflage. Wuerzburg: Curt Kabitzsch. 1912. Price, 2 m.

Since 1900, the progress of bacteriology has been so rapid as to require a new edition of Dr. Abel's book every year. Of this volume, as of its predecessors, it may be said briefly that it is by far the best concise technical guide to practical bacteriology to be had in any language. For laboratory workers who read German, it is simply indispensable.

DIE PHYSIKALISCHE THERAPIE DER GELENKKRANKHEITEN FUER AERZTE AND STUDIERENDE. Von Dr. Eduard Weisz, Budapest. Mit 83 Textabbildungen. Wien: Urban and Schwarzenberg (Rebman Company, New York). 1912. Price, \$1.50.

A small volume, in the form of a manual, which covers in a very superficial way some of the main points met with in the treatment of diseases of the bones and joints. The pathology is covered in 10 pages, and diagnosis is similarly treated. There are some useful points suggested in the illustrations and in the text.

HEART SOUNDS AND MURMURS. Their Causation and Recognition. A Handbook for Students. By E. M. Brockbank, M. D. (Vict.), F. R. C. P., Senior Hon. Assistant Physician, Royal Infirmary, Manchester. With Illustrations. London: H. K. Lewis. 1911. Price, 2 s. 6 d.

The worst that can be said of this book is that it is not interesting. Perhaps in the attempt at extreme simplicity, the author has overshot the mark; and perhaps a little more physic and a little more harmony would have added to the value of the volume. As it stands it can, however, be recommended as serving its purpose.

THE FRIENDS OF THE INSANE, THE SOUL OF MEDICAL EDUCATION, AND OTHER ESSAYS. By Bayard Holmes, M. D., Chicago. Cincinnati: The Lancet-Clinic Publishing Company. 1911. Price, \$1.00.

This is a collection of various unrelated essays. All that can be said of this book is that there are contained in it some things of an entertaining and instructive kind, and some things which would arouse sharp criticism, if one were so minded.

DIE KLINISCHE FRUEHDIAGNOSE DES KREBSES. Von Dr. Sehart, Freiburg i. Br., Spezialarzt fuer Chirurgie. Wuerzburg: Verlag von Curt Kabitzsch. 1912. Price, .85 m.

The various viscera are taken up in succession and the characteristics of early cancer of each described. The little monograph is well worth reading.

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EDITORIAL.

CAN A RABBIT BE INFECTED WITH SYPHILIS FROM THE BLOOD OF A PARETIC?

In a paper which Dr. William W. Graves, of St. Louis, read before the St. Louis Medical Society on April 19th, a matter fraught with the greatest interest was brought forward in that the possibility of the successful cultivation of spirochetes, either *in vitro* or in rabbits directly from the blood of latent syphilitics and paretics, was shown. The cases from which the blood was taken were two of typical paresis, one having been under constant mercurial treatment for a year and a half and one dose of salvarsan, the infection occurring eighteen years ago; the other having had mercurial treatment for two years, after which there had been none, the infection dating back fourteen years—incipient general paresis.

Uhlenhuth and Mulzer were the first to grow spirochetes in the testicles of rabbits from the blood-serum of syphilitics during the primary and secondary periods of the disease, and in one case from the blood of a syphilitic mother four years subsequent to an infection, who had recently given birth to a syphilitic child. Aumann confirmed their results by using blood and blood-serum from the secondary periods of the disease. Nichols and Hough have recently succeeded in growing spirochetes in the testicles of a rabbit from the spinal fluid in a case of relapsing cerebrospinal lues nine months after infection. Yet, though this has been done with a degree of success that is commendable, none of these investigators has succeeded in finding spirochetes with the dark field in the material used for inoculations. Nor have we a record of successful inoculations of rabbits' testicles or the cultivation of *Treponema pallidum* from the blood or spinal fluid, either from so-called latent syphilitics or paretics and tabetics. But now that Noguchi and Moore have demonstrated typical spirochetes in a number of brains of paretics, the interesting question that must hold our attention is whether an attempt to culti-

vate and otherwise recognize the virus of syphilis, mainly in periods remote from the time of infection and particularly in paretics and tabetics, can be ranked among those possibilities in laboratory work, which bear fruit in so decided a manner that their records are italicized in our scientific calendar. Dr. Graves, by his experiments, gives a positive reply to this question.

Beginning his work a little more than three years ago with the blood and spinal fluid, Dr. Graves has to-day studied some five hundred cases mainly in his service at the Alexian Brothers' Hospital, St. Louis. These cases were envisaged from every angle of observation and Nonne's four reactions were utilized in the diagnoses. Most of the bloods were collected from the forearm veins under sterile precautions, while a few were collected in ampoules from ear lobules. But on examination the smears, stained in various ways in native preparations and with so-called vital stains, with India ink, and studied by means of adequate dark field illumination, showed that only in one case—*lues spinalis* ten years after infection—were spirochetes found in the spinal fluid with the aid of the dark field, and only in two cases in the blood, and in these during the eruptive stage of the disease. Thus his results were of the same negative character as those of other investigators; and further study along these lines would have been discontinued had it not occurred to Dr. Graves to utilize Noguchi media in an attempt to grow virus directly from the blood of syphilitics. His work in the Pathological Laboratory at Cornell Medical School was of moment, for with the culture media which Noguchi had kindly given him and the privileges granted by Dr. Ewing, he soon achieved what he had set out to do—namely, to prove that although in the fresh and cultivated blood from syphilitics, in the later periods of the disease, the recognition of spirochetes is futile, yet by utilizing Noguchi media he was able to get impure cultures of spirochetes directly from the bloods in two cases—one thirty years, the other twenty-three years after infection.

Dr. Graves' experiments should give us pause, for they open up the much-discussed question of the latency of syphilis in humans. If, as has so often been contended, this disease is latent—that is, dormant—why is it that though the Wassermann reaction may be negative and the blood and spinal fluid of latent syphilitics be free from spirochetes, according to all scientific methods at our disposal, this same blood or spinal fluid is still capable of infecting the rabbit with syphilis? Surely here is no latency or dormancy, but rather the continual and constant presence of the virus of the disease, masked though it may be by the high resistance on the part of the patient—a matter that is to-day unexplainable, but which nevertheless obtains in all diseases, and in syphilis only

too often misleads the physician into the snare of making him think his patient is 'cured' when in fact the high resistance, and not so much the treatment, though the latter may strengthen the former, is the real cause of the apparent cure. Better, indeed, would it be for the syphilitic did physicians recognize the factor of relative tolerance for the virus, as recently emphasized by Dr. Graves (*Medical Record*, August 24th, 1912), than to continue to adhere to the idea of cure, for then observation of the syphilitic would not cease, and we would not hear as often as we do now, that though the patient was 'cured,' for no explainable reason he all of a sudden developed symptoms of paresis.

A MERRY WAR, INDEED.

The course of true love never did run smooth and the same might be said of science. It is not necessary to go back to former ages to verify this statement, for latterly the scientific world, both medical and philosophical, has given us enough illustrations to prejudice us for this thought. Professor Henri Bergson, by his "Creative Evolution," has drawn not only praises to his system of philosophy, but enough vituperation to make him feel that as a figure in the realm of philosophy his position is not impregnable. William James, who swept us off our feet by his illuminating exposition of that consolatory chapter in philosophy—pragmatism, would be quite grieved, were he with us to-day, to see how many holes have been thrust by adverse criticism into what he supposed would save mankind from pessimism. Ehrlich not only electrified the medical world by giving us salvarsan, but made enough conservative medical men run amuck, so that the spectacle was presented of a deep-dyed conservatism dancing to a piper's tune with an abandon unparalleled in the history of medicine. Yet in the *British Medical Journal* of April 5th Dr. G. Arbour Stephens writes that he gets just as good results by using distilled water! Dr. Franz Friedrich Friedmann makes bold to declare he has a serum that will knock tuberculosis higher than Gilderoy's kite, and immediately doubt is cast upon his discovery and every village in this very free country of ours sings its praises of some physician who has a better serum. Thus runs the tale; so why should we be surprised that even what was heretofore considered adamant—Professor Sigmund Freud and his most extravagant teachings—should be the butt of enough ridicule to show us some of the weaknesses when psychoanalysis is used as a Procrustean bed for the comfortable repose of certain characters in literature. Reference is here made to the really 'delicious' correspondence between Dr. Logan Clendening, of Kansas City,

and Dr. Isador H. Coriat, of Boston, published in the *Journal of the American Medical Association* in the issues of January 25th, February 8th, and March 8th.

The two characters in the vortex of the controversy are those Shakespearean creations which are beloved of all Freudians when they leave the common people of small minds and repressed emotions and sally forth into the realm of literature—namely, Hamlet and Lady Macbeth. Now, while Dr. Clendening is both witty and sarcastic, Dr. Coriat is most serious, and despite the pinpricks from his adversary, that at times bear a close resemblance to holes made by the largest drill, is so cocksure that the hysteria of Lady Macbeth was due to her childless condition and a repressed desire for a child that he is quite willing to invite the shade of the world's greatest dramatist to the festive board of all Freudians and even set upon its head a crown whereby all shall know that the first Freudian, of which the world has knowledge, has been found. That Dr. Coriat's position is not tenable is brought forth by Dr. Clendening, who quotes the lines beginning: "I have given Sucke," wherein this gentle heroine of Shakespeare's imagination gives vent to much of her intimate history, and by her words proclaims that she either had a child of her own or was a wet-nurse. But who can conceive of Lady Macbeth being a wet-nurse, or of any family, no matter how criminal, employing this lady to minister to "the Babe that milks me." In fine, according to her own words Lady Macbeth proclaims her motherhood: and though Dr. Coriat may read these lines in the light of a Freudian and even go so far as to say that he knows much better than Lady Macbeth herself that she never was a mother and that even if she posed as one she was guilty of a falsehood—here the interesting question arises, How truthful can a murderess of the Lady Macbeth stamp be?—we are weak enough to ally ourselves with Dr. Clendening, not only because we think he is right, but because his pen has the humor to write in the vein of one who knows that too much seriousness, when brought to bear on a controversy, betrays a narrow-mindedness that thwarts its purpose. Dr. Coriat may be the greater neurologist and Dr. Clendening only the man in the street, and Lady Macbeth may or may not have repressed a desire for a child, or perhaps for a normal child after giving birth to a monster which fortunately died in early infancy—may we be permitted this license since others have taken greater ones with the lady's private life?—and Hamlet may or may not have repressed a desire to love his mother in an unnatural way; but the pity of it all is that psychoanalysis, which is about the cleverest theory evolved by neurology in recent years, should be made by its most ardent admirers a sort of half-drunken idol that wobbles into places where its scientific reputation is at stake.

OPINION AND CRITICISM.

THE PASSING OF MORBID ANATOMY.

Our knowledge of the human body began with the study of anatomy. The early anatomists, laboring under the greatest difficulties, made clear, little by little, the structure of the human body, spurred on by the hope that thereby the cause and nature of disease might be made plain. Eventually, however, it became apparent that a knowledge of the dead body, however indispensable, could never unlock the secrets of life; and with the great discovery of Harvey, through his methods even more than through his results, modern physiology was born. Since then anatomy, whose method is observation, has steadily lost in importance as compared with physiology, whose method is experiment.

This phenomenon may be traced throughout the field of human knowledge: First the study of static phenomena by means of observation and then the pursuit of kinetics through experiment. In botany, plant morphology and classification are being replaced by plant physiology; descriptive zoology is yielding to the study of variations and of heredity; in history, a narrative of facts arouses less interest than a study of the fundamental causes that underlie them; in theology, dogmatic doctrine is giving way to an investigation into the origins of religion. This being so, it is not strange to find a similar metamorphosis at work in pathology. When Rokitansky and his greater pupil, Virchow, had laid the foundation of the science, an era of eager investigation was ushered in. Hundreds of enthusiastic investigators studied the results of disease, both in the autopsy room and in the histologic laboratory; and it cannot be denied that these researches threw a flood of light upon the nature of disease. But it soon became apparent that, however indispensable to a knowledge of disease the study of morbid anatomy might be, the key to the problem was not in its keeping. After all, the most detailed knowledge of the results of disease can never give us any direct information of the morbid processes themselves. For this purpose, an experimental study of the forces at work is requisite.

The first systematic application of this principle to the field of pathology was by the bacteriologists and, under the inspiration of Pasteur and Koch, their science has made giant strides. Little by little the same change in method has spread throughout the field of pathology, and the morbid physiologist is destined, to a considerable extent, to replace the morbid anatomist. The experimental study of cancer is now more

important than its histology, and, throughout internal medicine, the study of diseased function in replacing that of diseased tissue.

"The outcome seems clearly to be: Experiment, and ever more experiment. We come, indeed, back to Harvey's teaching—to search out the secrets of Nature by such means. But to that word, 'experiment' attaches no narrowing meaning. . . . The fact is that by experiments the worlds have grown, that experimentation is the one fundamental necessity of all progress, and the whole of animal life—life of every kind—to reap the benefit must share the risks and chance the pain."*

CONTROL OF COMMERCIAL LABORATORIES.

Perhaps when some future historian writes the story of medicine of to-day, he will characterize the period as the 'laboratory age.' The time has come when the enlightened patient no longer is satisfied with the rap, tap, tap of the finger on the chest or with the glancing view of a specimen of urine; he knows that the *x*-ray is used and that there are laboratories which make special studies—and often diagnoses—on urines by weird and mystical manœuvres. Not for such a patient is the doctor who seems able to diagnose merely by asking questions and examining the body; and if the doctor sees no reason for making laboratory inquiries, such a patient will soon enough ask him the reason for his delinquency.

Also, speaking in general terms, the modern physician has a due respect for laboratory assistance, and frequently laboratory medicine. Misconceptions of the interrelations between the clinical side and the laboratory side of practical medicine often produce a peculiar attitude. The day is not quite gone when a certain number of practitioners go as far as they can with a case, and then being still in a diagnostic labyrinth call on the laboratory to guide them out. That the man who uses the stethoscope should also be able to use the spectroscope is a conception just beginning to be accepted in America.

From these two short paragraphs a keen observer might deduce that there was a demand for laboratories. There *was* a demand, but now the supply of laboratories certainly fills the demand. And just as there are competent and incompetent doctors, so there are good and bad laboratories. Some are strictly scientific, some are purely commercial; and there is at present, for the general practitioner, no means of separating the good from the bad. The object of this editorial is to call attention to the potential harm in the present method, whereby any group of men can band together as a laboratory concern, hire a doctor to do some work, and

*The Passing of Morbid Anatomy. The Harveian Oration for 1912 Delivered at the Royal College of Physicians on St. Luke's Day, October 18, 1912. By Sir James F. Goodhart, Bart., M. D., LL.D. London: John Murray. 1912.

advertise themselves as experts! Unscientific work for revenue only is a grave possibility; and a wrong Wassermann test, or carelessness in examination of urine, may produce as great damage as a dose of antitoxin improperly standardized. Fortunately the latter cannot occur because of the Federal control of antitoxin laboratories; and that leads to the thought that some sort of control or license of the commercial laboratories should be welcomed. Certainly the practitioner would gain if he knew that all laboratories were safe; and the good laboratories need have no fear of their work being criticized. The laboratories for revenue only would soon find it difficult to exist when their rival's work was sanctioned by some critical board.

LITERARY NOTES.

How should a biography be written? what should be told and what suppressed? Should there be a glossing over of faults that were defects in the character of the subject, or should the veil be rent asunder? These are vital questions, indeed, and moreover of paramount importance in the making of a book that is to tell us the true life of another. Now, despite many years of warring conditions, no agreement has been reached as to any fixed rules in regard to biographical writing; hence each biography must be judged according to the bias of the critic. In the case of Mr. Morley Roberts' "The Private Life of Henry Maitland" (George H. Doran Company, New York) our judgment swerved from one to another view, for though we admired the author's love of the truth, his purport to tell the story of another's life in no disguised terms, we could not but deprecate the unnecessary details of the description of a theft perpetrated when Maitland—this is but a thin disguise for George Gissing, the novelist—was still a boy, and of his marriage shortly after to a prostitute. If there was another literary man in modern times, besides Gissing, who had a harder road to travel, who had more obstacles to contend with, whose periods of happiness were more fitful and of shorter duration, whose conscience was more on the alert to draw him into pitfalls a shrewder man would have avoided, the present reviewer is ignorant of the fact; and until informed to the contrary he will continue in the thought that never has fate played a sadder game than she did with this English novelist. Anyone born in the lap of luxury, or near enough to it to know what a help it must be to struggling talent, can but ill appreciate the hunger of Gissing's American days, his frustrations, and his despair of getting work in the literary line. And even after his return to England and when his prospects should have been brighter on account of the publication of his first novels, he was dogged by want and fretted by the carking cares that come in the train of all wretched and lonely existences. That a mind as brilliant as Gissing's should con-

stantly be beset with the worries of eking out a precarious living is one of those chapters in literary history over which we would rather not cogitate too long lest our criticism of an ungrateful world be too severe. But whether the man was to blame—a certain shyness may have made him indifferent to mere acquaintances—or whether it was all a matter of circumstance, what is evident is that here we have as good a manifestation as can be found in modern times of a man of exceptional parts never being able to vanquish ill luck or drive away the pall that rests so heavily on the sorely tried during their long fight against poverty and sickness.

A point of view that has the effervescence of youth is an enviable quality in literary matters; but, even though we are kindly disposed toward it, there are times when its unbridled rampages are not only an artistic defect but a glaring mistake. This must be evident to all intelligent readers of "Pathfinders of Medicine" by Victor Robinson (Medical Review of Reviews, New York), for on nearly every page there is the sort of blemish that exasperates, especially when the reader has just settled down to enjoy what would otherwise be very good reading. That the author has studied his subjects in a thorough manner is greatly to his credit; but what is not so greatly to his credit is that he has boiled them down in the same crucible of vivid imagination and untutored fancies that make one long for only one pinch of judgment to act as a restraint. That only by this process can 'fine writing' be achieved is a huge mistake, since it is a fact that if you really want to do the sort of 'fine writing' that will tell, flamboyancy must not be its watchword. As illustrative of what we mean we would call the reader's attention to the essay on Versalius, which not only starts out with 'fine writing,' but is a veritable *tour de force* from beginning to end. And certainly the story of Versalius' life could be told to-day in the measured terms of what even a slight approach to literary craftsmanship would demand. If we feel harshly toward this essay it is because we are more or less imbued with what Morley has told us in his splendid tribute to the Italian anatomist, a tribute that has all the earmarks of literature, and that once read and understood for its intrinsic value will make lesser attempts, especially when they are marred by 'fine writing,' dwindle into a lowly place. But justice should be done to all authors, for has not the elder Pliny said: "I never read a book so bad but I drew some knowledge from it"? And in this instance we would commend to the reader's notice the essays on Laënnec, Hunter, and Simpson as efforts, on the author's part, that show that 'fine writing' is not absolutely necessary to make a subject readable. But even at his best from our point of view, what is constantly written across the page is that here is an author who is a good illustration of what Dickens meant when he said: "That magnificent animal, a young man."

That quality which constitutes the new spirit in poetry is again the leading factor among a number of unusual points in Mr. John Masefield's latest volume "The Daffodil Fields" (The Macmillan Company, New York). When we write 'again' it is meant in no disparaging sense, but in grateful recognition of the fact that here is a poet who can write so that the common people can understand, who has done this unfalteringly in his previous volumes—"The Everlasting Mercy," "The Widow in the Bye Street," "The Story of a Round-House"—and who no doubt will continue to do so; for it cannot be conceived for a moment that so strong a mind as Mr. Masefield's can revert to the worn-out poetic ideals of a former generation and even of the poetasters of to-day, who find it easier to follow a bell-wether than to strike out for themselves. Now, if the medical reader desires an introduction to the new spirit in poetry, let him read these pages carefully, let him study their simplicity and their power, let him take unto himself the same truthful lessons of the ways of man that are his when his keen observation makes note of each clinical manifestation in the building up of a complete history of a case. And if, after what has been told him by this reviewer, he is still stubborn to a recognition of the vital interests of Mr. Masefield's poetry, he must indeed be the sort who ranks acumen, close observation, and the sterling qualities of truth among the things which are negligible. The word 'modernity' has been so overworked of late that to use it is to invite criticism; but when speaking of Mr. Masefield's incomparable contributions to literature it is expressive of much, provided it is used as it should be; for on every page of the book under consideration he shows his alliance with the thought of to-day, with its audacities and its breaking through the shell of conventional writing, with its desire to live in such wise that a new force, or rather the galvanization of an old force, shall dominate our point of view in the hope of bringing us nearer to the one great lesson of life—truth.

When a book is published with the announcement that its message is one that cannot be overlooked and that the serious-minded in the community are being addressed as never before, it cannot be laid at the door of a critic that an expectant mood is an unnatural mood. But with every desire to meet Elizabeth Robins' "My Little Sister" (Dodd, Mead and Company, New York) in a kindly way that takes small account of minor faults, we cannot but admit that as an intimate study of the white slave traffic—and this is the publisher's announcement—it falls decidedly short of its promises. The feminine touch is too evident; in fact, many pages which should stand out with some degree of masculinity are marred by a mawkishness that is wholly unnecessary. The heroine is not painted in convincing colors, that is the childishness of her mentality is overdrawn so that the wickedness of others will be more apparent.

To juxtapose extreme innocence and black-dyed wickedness is the sort of trick that belongs by right of constant repetition to the novels of a former day when it was the fashion to enlist the sympathies of the reader by this sort of theatricalness. In short, instead of what the publisher and some critics have told us to expect, we have in this book so weak a presentation of the white slave traffic of to-day that to place it in a reader's hands with the promise that enlightenment will result is playing with his gullibility. Medical men, who have read Zola in the original—his "*La Bête Humaine*," his "*La Terre*," and his "*L'Assommoir*"—who have read Edmond de Goncourt's "*La Fille Elise*," will derive small profit from pages which have all the deprecatory sentimentality of Richardson and the garish melodramatics of an Hogarthian drawing. As a sympathetic study of a young girl's character "*My Little Sister*" passes muster, and its chiaroscuro is worthy of considerable commendation. Nor is the literary quality of the book to be despised, since this is of a good grade though not of the highest. But as a document that photographs conditions to-day in our social world, which Senate Committees and Vice Commissions are attempting to eradicate, it cannot be considered in any very serious light.

In "*Insomnia: Its Causes and Treatment*" (Cornish Bros., Birmingham, Eng.) the author, Sir James Sawyer, betrays not only a charming literary style but a sanity and poise that immediately bespeak the goodwill of the reader. In the majority of the books on insomnia the vagaries of the authors, as expressed in the etiology and treatment, are of such a nature that even the calm and philosophical reader is not only at a loss to understand, but is made a-weary by the long list of medicaments. No such criticism can be visited on Sir James, for his advocacy of treatment is of the simplest and his description of the causes is couched in language that has the degree of moderation that can come only after weeding out what is unnecessary. No doubt there will be readers of this book, who will say that it is too old-fashioned to hold their attention, and that what they really want is something that is still in the controversial stage. But even admitting that the majority may be of this opinion, there is still the minority to consider and they also have a right to their judgment. And it is with the minority that we would ally ourselves, for we feel that they will place manner alongside matter, and will gratefully receive the kindly instructions set forth in this book, and not whimper in the least because there is an absence of those tortuosities of medical thought that blur instead of clear up the clinical picture. Sir James has indeed written a book that is worth while and which will be taken up again and again by the reader when in sheer weariness he turns his back on all those conflicting theories that have made the disturbance known as insomnia the modern bugbear of the practice of medicine.

ORIGINAL ARTICLES.

THE PRACTICAL APPLICATION OF ABDERHALDEN'S BIOLOGICAL TEST OF PREGNANCY.*

By HENRY SCHWARZ, M. D., of St. Louis.

In the March number of the JOURNAL the writer gave a minute description of Abderhalden's serodiagnosis of pregnancy by the dialyzation method, and made the announcement that work done in the Department of Obstetrics at Washington University Medical School absolutely confirmed the claims of Abderhalden.

Since the publication of the first article, this method of diagnosis has been added to the routine work of the obstetrical laboratory; and it enables us to make a positive diagnosis of the existence or the non-existence of pregnancy at a time and under conditions which heretofore rendered a positive diagnosis impossible.

It is true that this is not always a matter of vital importance, and that by waiting two or three months a positive diagnosis can be made without the painstaking biological test.

There are, however, many cases in which the serodiagnosis of early pregnancy finds suitable application; and the time will come when the test will be recognized by the courts as an absolute proof of the existence or the non-existence of pregnancy.

The following is a case in point: A girl, seventeen years old, was admitted to Washington University Hospital on April 8th, on account of moderate uterine hemorrhage. Her father stated that he suspected a certain man of having seduced the girl and that there might have been an attempt at criminal abortion. The girl protested her innocence and refused to be examined or treated; rest in bed caused the bleeding to subside. On April 9th the girl submitted to an examination of her blood.

From the arm 10 c.cm. of blood were drawn into a sterile centrifuge tube and centrifuged; of the clear, pale-yellow serum 1.5 c.cm. were used for the test, and another 1.5 c.cm. were inactivated by heating in the water bath to 60° C. for thirty minutes and were used for a control test. For further control 10 c.cm. of blood were taken from a woman thirty-eight weeks pregnant, and of the clear, pale serum obtained from

*Read before the Verein Deutscher Aerzte, St. Louis, April 25th, 1913.

it 1.5 c.cm. were used for a second test, and another 1.5 c.cm. were inactivated and used for a second control test.

The four dialyzers were placed in the incubator at 2 p. m.; on April 10th at 11 a. m., that is after twenty-one hours, the experiment was interrupted and the dialysates were tested with ninhydrin.

The dialysate derived from the test with the serum of the pregnant woman gave the characteristic deep violet-blue color; the dialysate from the control remained colorless; the dialysate from the test with the serum from the suspected girl gave likewise the deep violet-blue color; while the dialysate from the control remained colorless.

The diagnosis of pregnancy was thereupon entered on the girl's record, together with the details of the test. The girl was told that she was pregnant and she changed her attitude and admitted the fact. Her last menstruation had started March 1st; on April 7th, when ten days overdue, the attempt was made to open her womb; moderate hemorrhage followed and the girl entered the hospital.

Local examination showed the uterus anteflexed, movable, approximately of normal size. The left side of the cervix had a small wound from which the blood was oozing. After a few days of rest the girl was ready to be discharged, and through the social service department she was placed in the care of a suitable institution.

The question arises, What might have happened if the girl had left the hospital without making a confession? An abortion might have been induced, and after the removal of the evidence, suit might have been brought against the hospital or against members of the obstetrical staff for libel and slander. In such an event, would the records of the biological test have been accepted by the courts as positive proof of pregnancy? Eventually, such will undoubtedly be the case, because, when all the precautions insisted upon by Abderhalden are observed and when a sufficient number of control tests are employed, the test always gives positive reaction during pregnancy from the end of the second week after menstruation has been passed (on the twelfth day in the case here quoted) until the fourteenth day after pregnancy has ceased to exist. The test is always negative in the absence of pregnancy and recent delivery, except in cases of chorio-epithelioma where we naturally expect the reaction for an indefinite period after delivery.

Where the differential diagnosis of pregnancy by the biological method is of vital importance, we must insist that evidence is produced to show that all sources of error have been safeguarded against.

The placental albumin must be prepared and must be tested, before each experiment, in the manner prescribed by Abderhalden.

We go a step further and prepare the albumin from placentas that are absolutely fresh. Immediately after the placenta is born, it is freed from blood by forcing water through the stump of the umbilical vein until it returns clear through the arteries. The placenta is then

treated in the way described in the previous communication, and the resulting albumin is preserved in chloroform water under toluol, and kept on ice in small bottles. For each experiment an original package is opened; the contents are washed until all traces of chloroform and of toluol are removed; they are then boiled for five minutes in about five times their bulk of water; this water is next filtered through a hardened filter; 5 c.cm. of the filtrate are placed in a test-tube; 1 c.cm. of a 1 per cent. aqueous solution of ninhydrin is added and the contents of the tube are boiled for exactly one minute. If on cooling the tested liquid remains colorless, the albumin is used for the day's experiment, but not otherwise.

The blood for the test must be taken while the individual is fasting, and the serum resulting from it must not show the least trace of hemolysis.

The dialyzing thimbles must have been tested for their impermeability for colloids and for their permeability for peptones. There is always great danger that a thimble may leak, and for this reason it is best, in important cases, to secure enough serum to carry on at least two tests and one control, and again to test the thimbles immediately after the experiment.

For additional control we usually use serum from a case of advanced pregnancy, and, likewise, serum from an individual known not to be pregnant. The latter proves that the reaction is always negative in the absence of pregnancy; the former proves that the reaction is always positive when pregnancy exists; the negative results with the inactivated sera prove that the substances giving the positive reaction are due to the action of the proteolytic ferments on the placental albumin.

Each experiment is thus carried on in from six to eight dialyzers, each of which is charged with 1.5 c.cm. of serum and with 1 gram. of placental albumin. By charging two or three dialyzers with serum from the suspected case, the danger of having to repeat the test on account of a leak in the dialyzer is reduced to a minimum.

Hemolytic serum is unfit for use; not so much because it contains more or less hemoglobin, as because in the breaking down of the form-elements of the blood, proteolytic ferments are set free, which will cause cleavage of the placental albumin and produce a positive reaction in the absence of pregnancy. These ferments are distinctly different from the ferments of pregnancy; the latter are specific in the sense that they are active on placental proteids and on their near relatives among the proteids only.

The blood must be drawn while the individual is fasting, because at the height of digestion the blood contains sufficient quantities of dialyzable substances to give the ninhydrin reaction, thus endangering the reliability of the test; the same is true in pathological conditions associated with increased destruction of the body proteids. To guard against this source of error, it is necessary to work with small quantities of serum (1.5 c.cm.) and to make absolutely sure of the reliability of the placental albumin.

Abderhalden has repeatedly pointed out that ninhydrin gives the characteristic blue color-reaction only in the presence of a certain minimum quantity of substances possessing an amino-group in α position to the carboxyl group. The serum alone may give off into the dialysate a number of these substances, but not sufficient in number to bring about the reaction; however, if the placental albumin likewise gives off a small quantity of these substances into the dialysate, the total amount of these substances in the dialysate derived from these two sources may reach the required minimum to bring about the reaction and render the experiment worthless.

These are some of the setbacks the writer referred to in his previous article, when he said, that after many trials and tribulations he was at last obtaining results absolutely confirming Abderhalden's claims.

The writer now wishes to take issue with Williams and Pearce, of Philadelphia, and to challenge some of the statements made by these investigators at the recent meeting of the Society for Experimental Biology and Medicine in New York.

Williams and Pearce claim that they have obtained positive reactions with the biological test for pregnancy in at least 6 non-pregnant individuals—namely, in 2 cases of nephritis, 1 case of tabes, 1 case of carbuncle, and in some cases that were in perfect health. These writers likewise make the very remarkable statement that inactivation does not cause the reaction to disappear entirely.

The latter statement in itself proves that some of the positive reactions, which Williams and Pearce obtained, were not due to the action of proteolytic ferments on placental albumin while the experiment was under way, but that they were due to the fact, that dialyzable substances giving the ninhydrin reaction were contained in the serum and in the albumin with which the dialyzing thimbles had been charged.

The writer is convinced that further experimentation will cause Williams and Pearce to discover the sources of error in their present methods, and will induce them to correct the erroneous statements made in New York.

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While this paper was in press the April number of *Surgery, Gynecology and Obstetrics* appeared, containing the complete article of Williams and Pearce, which fully confirms the writer's estimate of their work.

Their investigations are absolutely worthless and must be entirely disregarded. They worked with placental albumin which still contained dialyzable substances giving ninhydrin reaction; they worked with hemolytic serum containing the proteolytic ferments liberated by the breakdown of the form-elements of the blood; they contaminated their material by handling; and they do not even appreciate the reason why hemolytic serum is unfit for use.

Table 5 in their article shows that inactivated serum, which had given a negative reaction when tested by itself, gave a positive reaction when placental albumin was added to the test, thus proving that the substances giving the reaction were contained in the placental albumin. Table 5 likewise shows that serum, which gave negative reaction when tested by itself, gave a positive reaction after inactivation, thus showing that it had been contaminated during the process; and under table 6 of tests with boiled filtrate and ninhydrin the following statement is made: "Also we have found that if coagulation is complete, so that the filtrate is clear, the difficulties due to hemoglobin-stained sera disappear." This proves that they do not appreciate the reason why hemolytic serum is unfit for use.

The same number of *Surgery, Gynecology and Obstetrics* brings the report of the careful investigations of McCord, which are in full accord with Abderhalden's claims and which led McCord to the conclusion that "the serodiagnosis of pregnancy is both reliable and practical."

BIBLIOGRAPHY.

- Schwarz: Abderhalden's Serodiagnosis of Pregnancy and Its Practical Application. (*Interstate Medical Journ.*, Vol. XX, No. 3, pp. 195-203, March, 1913.)
- Fauser: The Protective Ferments. (*Deutsch. med. Wochenschr.*, No. 52, 1912.)
- Fauser: Further Investigation with Abderhalden's Dialyzation Method. (*Deutsch. med. Wochenschr.*, No. 7, 1913.)
- Lindig: Serum Fermentation During Pregnancy and in Tumor Cases. (*Muench. med. Wochenschr.*, No. 6, 1913.)
- Abderhalden: Serum Fermentation During Pregnancy and in Tumor Cases. (*Muench. med. Wochenschr.*, No. 8, 1913.)
- Abderhalden: Regarding the Question of Specificity of the Protective Ferments. (*Muench. med. Wochenschr.*, No. 9, 1913.)
- Henkel: A Contribution to the Biological Diagnosis of Pregnancy. (*Archiv fuer Gynäkologie*, Vol. 99, No. 1, 1913.)
- Williams and Pearce: Abderhalden's Biological Test for Pregnancy. (*Proceedings of the Society for Experimental Biology and Medicine*, Vol. 10, No. 3, p. 73; Abderhalden's Biological Test for Pregnancy. (*Surg., Gynec. and Obstet.*, Vol. XVI, No. 4, pp. 411-418, April, 1913.)
- McCord: Serodiagnosis of Pregnancy. (*Surg., Gynec. and Obstet.*, Vol. 16, No. 4, pp. 418-421.)

SUMMARY OF INVESTIGATIONS IN TUMOR GROWTH CARRIED OUT IN THE RESEARCH DEPARTMENT OF THE BARNARD (FREE) SKIN AND CANCER HOSPITAL, ST. LOUIS.*

By LEO LOEB, M. D., of St. Louis.

I may, perhaps, be permitted to state in the beginning, the principle which has always guided me in my investigations—namely, to build up our work from as broad a basis as possible, to cultivate those fields of cancer research which are related to neighboring sciences, in order to obtain as broad an outlook on our problems as possible. In our case that meant that we did not limit ourselves to a study of cancer when it had already been fully developed, but that we also studied the reactions of normal tissues to various stimuli, in order to get nearer to an understanding of the conditions under which normal tissue can assume that rapid and infiltrating growth which we call cancer. Our work must be, to express it that way, synthetical as well as analytical. We have to try to build up cancerous from non-cancerous tissue on the one hand, and, on the other hand, we have to analyze fully developed cancer and learn to know its laws of life and growth.

After these introductory remarks I wish to consider more in detail some of our investigations. There are, of course, at the present moment, a number of investigations under way which I believe to be of great interest and importance, but which are as yet in too incomplete a condition to be referred to on this occasion. On the other hand, I shall include in my report some investigations which were begun by me while still at the University of Pennsylvania, and which were finished here in St. Louis. I will also state that only the principles underlying our research work will be discussed, without going into any of the many details.

As to the first part of our investigations—namely, those concerning the analysis of the growth of normal tissues, it would be well, perhaps, to begin with some investigations which Drs. M. G. Seelig and Llewellyn Sale carried out within the last year. It is well known that one of the characteristics of cancer is the power of cancerous cells to infiltrate neighboring tissue. About fifteen years ago I found that normal tissue can also, under certain conditions, show a tendency to infiltrate adjoining tissue without becoming cancerous. At that time my investigations showed that if you make a defect on the white skin of guinea-pigs and cover this defect by black guinea-pig skin, the black skin begins to infil-

*Read by invitation before the St. Louis Medical Society, March 8th, 1913.

trate the neighboring white skin after some time. On the other hand, if you transplant white skin into a defect of black skin, the neighboring black skin begins to invade the implanted piece of white skin; also that the white skin, after being transplanted, was desquamated to a decidedly greater extent than transplanted black skin. This investigation shows first, that one kind of tissue can invade another tissue, at least for some time, without any consequent development of cancer, and we see, furthermore, that pigmented skin shows a very much greater invasive power and a greater power of resistance to injurious influences than white skin; an interesting fact if we consider how malignant is the growth of pigmented tumors in many cases. Drs. Seelig and Sale found that the skin behaves differently, depending on whether it is transplanted on the same animal, from which it was taken, or other animals of the same species. Black skin transplanted on the same animal behaves in the way described in my previous investigations. However, black skin transplanted on another animal of the same species takes in a much smaller proportion of cases; and in those cases in which it takes, it does not invade neighboring tissue, and it even loses gradually the greater part of its own pigment. We see, therefore, that one of the conditions of the invasive power of tissue consists in its being supplied with adequate nourishing material which it can assimilate. If food is supplied which it assimilates imperfectly, it suffers, not only in that normal metabolism which permits it to build up pigment, but it also loses its power to invade the neighboring tissue. Moreover, such tissue which suffers through lack of the proper food is at the same time reacted against by the host as a foreign element; and we see, therefore, around black epithelium transplanted on another animal of the same species, collections of mononuclear cells which even invade the transplanted epithelium and partially destroy it. In other words, the host tissue behaves toward such epithelium as it does towards carcinomatous tissue, around which it also frequently forms collections of mononuclear cells that invade and occasionally destroy part of the carcinoma. Such collections of mononuclear cells have been held by Ribbert and other investigators to precede a cancerous transformation of normal tissue, and even to be its cause; but these investigations, as well as some other observations which will be referred to later, show that such collections of mononuclear cells are not restricted to carcinomatous proliferation, but occur also if normal but foreign epithelium is present. If we transplant black skin on defects of the same animal in which the black skin originated, such a collection of mononuclear cells does not take place. In a similar manner Dr. Seelig found that white epithelium transplanted on a defect of black skin is cast off very much more frequently if transplanted on another animal of the same species than when transplanted on the animal in which the skin originated. In both cases, however, the white epithelium, if it sticks, is invaded by the neighboring black epithelium.

It is a well-known fact that tumors of different organs and tissues are characteristic for different species of animals. It was, therefore, of interest to investigate whether there exists any difference in proliferative power in the corresponding tissue of different species. In conjunction with Dr. Addison, I compared the skin of the guinea-pig and pigeon, and found that in conformity with the greater thickness of guinea-pig skin, as compared with pigeon skin, the normal cell proliferation is more marked in the guinea-pig skin than in pigeon skin, and that correspondingly, during regeneration and transplantation, the proliferative power of the guinea-pig skin is greater than that of pigeon skin. These studies led also to some very interesting conclusions concerning the mechanism of regeneration which we cannot consider at this time.

In order to understand the difference in the behavior of carcinomata of different organs, it was necessary to analyze the difference in the normal growth and the regenerative power of various organs and tissues. Further efforts were made in this direction. While Dr. Max Myer found that the kidney after transplantation shows the most active proliferation about five to six days after transplantation—the actual growth of kidney tubules taking place at that time—and while he also found that the same animal from which the kidney was taken permits a very much more active growth of the kidney than the kidney of other animals of the same species, Dr. Carroll Smith noticed that, after transplantation of the thyroid, the most active growth takes place at a very much later period—namely, about six to twelve weeks after transplantation. This shows a marked difference in the laws governing the growth of kidney, on the one hand, and thyroid, on the other. These investigations will be extended in various directions. Dr. Smith also investigated whether iodine, which according to Marine causes a retrogression of adenomatous growths of the thyroid, has an inhibiting effect upon the regenerative growth of the thyroid. Although this investigation is not yet concluded, it seems from the present observations, that iodine does not have such an inhibiting effect on the regenerative growth of the thyroid.

A certain class of pathologists, especially Ribbert, consider regenerative growth as a prototype of growth in general, and try, accordingly, to explain cancerous growth through an application of the laws of regenerative growth. In my opinion this is a wrong point of view. Regenerative growth is only one type of growth, and there are other types of growth which have much more similarity to tumor growth. I analyzed such a type of growth—namely, the development of placental tissue. Here we have an extremely rapid cell proliferation, within a very short time, under the stimulus of ova developing in the mucosa of the uterus. It is of great interest to analyze such a rapid growth, to find its cause, and also to find why such a vigorous cell proliferation ceases after some time. As I have already shown, it is possible to produce, experimentally, placentomata which may be classed among the transitory tumors. I found

that a combination of two stimuli is necessary for the production of these transitory tumors—namely, first, a chemical sensitization of the uterine mucosa and, secondly, a mechanical stimulus which may be excited either through the embedding of the ovum or through cuts, or even through the introduction of a foreign body into the lumen of the uterus, the foreign body acting like an ovum. We learn from these experiments that in order to produce a tumor-like growth, the result depends, not only upon the inciting cause, which in this case consists either in the introduction of a foreign body or trauma of the uterine mucosa, but that it also depends upon the condition of the tissue which is affected by that external stimulus. Trauma in an ordinary mucosa of the uterus causes hardly any change whatever, while in the mucosa, sensitized by some chemical substance, it causes a proliferation of tumor-like dimensions; and, going still further in my analysis of the kind of stimulus which in this case calls forth proliferation, it was found that it is really not the trauma as such, which has this marked effect, but that it is an eversion of the mucosa, caused by the trauma, which is the potent factor. Such cuts, which did not lead to an eversion of the mucosa, did not cause the production of placentomata. The further we proceed in the analysis of growth-phenomena taking place in tissues and organs, and also, as we shall see later on, in tumors, the more we recognize that we have to deal with very complex processes consisting of a combination of conditions favoring growth and of conditions inhibiting growth; and it is just as important for us to recognize factors inhibiting, as those calling forth growth, if we want to arrive at an understanding of the first origin of cancer.

Attention has already been called to the investigations of Dr. Smith in the action of iodine on the regenerative growth of the thyroid. Mention may be made here of a factor inhibiting normal growth discovered recently. Normally, the corpus luteum calls forth cyclic growth phenomena in the uterine mucosa. Now I found I could cause, experimentally, at various periods during pregnancy, the formation of corpora lutea; and while, as has been stated, in a non-pregnant uterus the production of corpora lutea leads to certain growth phenomena in the uterus, the presence of an embryo or placenta at one place of one of the horns of the uterus prevents this growth from taking place. It is, therefore, very probable that during pregnancy some substance is given off which prevents the cyclic proliferative changes in the uterine mucosa. Cyclic changes were noted in the ovaries, and it may be stated that these changes depend primarily on the function of the corpus luteum. Any further discussion of these investigations would be impossible here.

As you know, it is possible to cultivate normal tissues in culture media and in the test-tube, and to examine their behavior and growth under conditions which can be varied experimentally. In conjunction with Dr. Moyer S. Fleisher, my former studies in this direction were continued, and I again found, to mention some of the results obtained, the importance

of contact with solid bodies, the stereotropic sensitiveness of normal and cancerous tissue for the direction in which the cells move in the culture media. This stereotropic sensitiveness by directing the cancer cells causes them to penetrate deeper into the neighboring tissues, in the same way in which it attracts the cancerous, as well as the normal connective-tissue and epithelial cells, and directs their movements in culture media. Various kinds of cells may send out processes and move along the fibrils. We, furthermore, found the importance of the presence of oxygen for the growth of cancer, as well as normal tissue, cells. In a hydrogen atmosphere both cell life and proliferation cease. There is no essential difference in this respect between tumor and normal tissue cells. We have carried on, and are still carrying on, comparative studies concerning any possible differences in the sensitiveness, towards lack of oxygen, of normal tissue cells, on the one hand, and of cancer cells, on the other; but we have not yet arrived at a definite conclusion. It seems to us, however, very probable that, especially, sarcoma cells, with which we are working at the present time, are more sensitive and less resistant to various injurious influences, which may be encountered in the test-tube, than are regenerative connective-tissue cells.

Let us now turn to studies in which we analyzed, directly and solely, the conditions of the growth of cancerous cells, and let us first consider some biological aspects of these investigations. Bashford and his collaborators, and later Calkins, maintained that normally rhythmic changes take place in the growth of tumors. The period in which the transplantability or the growth energy is greatest is, according to these authors, regularly followed by a minimum period. This fact, if correct, would be of great interest, inasmuch as it would probably also apply to human tumors. I considered it, therefore, of interest to study, from this point of view, tumors which we transplanted, under various conditions through several years, into many thousands of mice. Dr. Fleisher, who carried out these investigations, came to conclusions entirely different from those of Bashford and Calkins. He found that such rhythms do not exist in the life of tumor tissue, and that only those variations can be observed which are due to the presence of accidental factors. We found, however, another characteristic of tumor cells, which is very important also from a practical point of view—namely, the power of tumor tissue, exposed to unfavorable conditions, to recuperate. As I had previously ascertained, it is possible to decrease the virulence of tumor cells by exposing them to various degrees of heat, or to the action of certain chemicals, before inoculation into the animal. Now, we found in further experiments that it is possible to retransplant particles of tumor, which were taken from tumors whose virulence had been decreased through several generations, into new animals, and to obtain again fully virulent tumors if the material used last had not been heated before transplantation. We are investigating, at the present time, the factors which are concerned in this

experimentally produced decrease of the virulence of tumors; and it is very probable that it is a complex phenomenon in which processes of immunity play a certain part. These latter investigations, however, are not yet concluded.

In the past two decades the microscopical study of the first origin of cancer, such as can be seen in sections made through early stages of developing carcinoma, has played a great rôle in pathology. The conclusion of Ribbert, as to the importance of inflammatory changes in the connective-tissue and a possible separation of parts of the overlying epithelium through such inflammatory changes, played a considerable part, in the discussion of the problem, as to the first origin of cancer. Others like Spude and Janeway suggested the importance of blood-vessels in the first origin of cancer. It was assumed by these investigators that blood-vessels attracted the epithelium and caused it to infiltrate the underlying tissue. We had recently occasion, in conjunction with Dr. W. O. Sweek, to study various stages in the development of a multiple carcinoma of the skin, and we found the first change to consist merely in increased proliferation of the lower cells of some papillæ. This increased proliferation found its morphological expression in certain changes of the nuclei and cells which permitted us to differentiate the early cancerous from the normal tissue. This proliferative change of the epithelium was connected with certain degenerative or atrophic conditions in the surface epithelium and certain places of the connective-tissue, but was quite independent either of inflammatory changes or of any influence exerted by blood-vessels in the underlying cutis. We have evidently to deal with a primary increase in the proliferative and infiltrative power of the epithelium, caused either directly by external stimuli or induced by certain atrophic changes in the connective-tissue, which may have led to alterations in the metabolism of the epithelial cells, and later may have had a stimulating effect on these cells, leading to their cancerous proliferation. This is, of course, only a suggestion which would, it seems to us, explain more satisfactorily the first origin of cancer, in such cases, than the explanation given by Ribbert, Spude, Janeway and others, or by those who, like Councilman, for instance, assume that a change in the connective-tissue leads to a decrease in the mechanical tension under which the epithelium stands. In our case, the underlying tissue was very resistant to the intrusion of the proliferating epithelium; indeed, so much so that the epithelium was in one instance forced to proliferate to the outside of the skin when it could not proceed downwards.

In another organ we succeeded in making some observations which helped to clear up the origin of a certain very interesting class of tumors—namely, the teratomata of the ovaries. The most widely accepted explanation of the origin of these tumors is the one advanced by Marchand, who suggested that aberrant blastomeres developed into such teratomata. He believed that, inasmuch as there exists no proof for the parthenogenetic

development of ova in mammals, the origin of teratomata from parthenogenetically-developed ova to be very improbable. Now our study of the ovaries of several hundred guinea-pigs makes it very probable that in a certain percentage of cases, ova in the ovary of the guinea-pig actually begin to develop without previous fertilization of the ovum. We observed in the ovarian follicles, structures which closely resemble parts of the placenta and of the developing embryo of the guinea-pig. These observations make it very probable that teratomata, and, perhaps, also certain other tumors of the ovaries, owe their origin to parthenogenetically-developing ova and not to aberrant blastomeres.

We were able to make still another observation which is of interest in the study of the etiology of tumors. We observed a mouse tumor which I designated as a combination-contact-tumor. In this case we found that a very young tumor, originating from the ducts of the mammary gland, called forth a cancerous proliferation of the surface epithelium, at those places where it touched the overlying ulcerated skin. This observation is of special interest in connection with previous observations by Ehrlich and myself on the production of a sarcoma after transplantation of a carcinoma. In both cases, contact of one kind of cancerous tissue seemed to call forth the transformation of the normal tissue, with which it was in contact, into cancerous tissue. How such a transformation is brought about, whether through the action of micro-organisms which are transmitted, or through some toxic influences, we cannot state at the present time.

For a number of years certain investigators, especially San Felice and Leopold, held the opinion that yeasts were the cause of cancerous growth. A few years ago Leopold stated that, by an improved method of treating cancerous tissue, he could obtain yeasts from a large majority of cancers. We thought this statement of sufficient importance to test its validity, and in conjunction with Dr. Moore, of the Missouri Botanical Garden, and Dr. Fleisher, we investigated cancerous tumors as to the presence of yeasts; only in one case, in a sarcoma, did we find a yeast-like organism, notwithstanding our efforts to apply all the methods recommended by Leopold and the addition of some new methods for the cultivation of yeasts. The organism, which we found in one case, was studied thoroughly in its effect on animals. It was found that it did not give rise to any tumor formation, but killed rabbits after intravenous injection through occlusion of the kidney tubules. The kidney is an organ in which the yeast-organism proliferates very much more rapidly than anywhere else. We also studied *in vitro* the effect of yeasts on tissue cells. We found that kidney cells and yeasts could grow side by side for some time, but that very soon yeasts penetrated into the kidney cells and even into their nuclei and destroyed them. The polymorphonuclear leucocytes, which defend the cells inside the body, were absent in the test-tube, and here the tissues were therefore helpless in their struggle

with the yeasts; but as far as the origin of cancer is concerned, the main result of these investigations is that yeasts are of no importance.

Within recent years several biochemical methods have been described by various investigators, by which it was believed to be possible to diagnose cancer in cases in which the ordinary methods gave doubtful results. The majority of these methods depend upon the biochemical changes taking place within the blood of the patient affected by cancer. Within the last three years Goldberger, in Budapest, announced that the blood-serum of cancerous patients has a much stronger inhibiting effect on the hemolysis caused by certain inorganic and organic acids, than that of healthy persons or of persons suffering from diseases other than cancer. If these observations should prove correct, they would offer us a relatively simple method for the diagnosis of cancer. Drs. Sweek and Fleisher repeated the experiments of Goldberger in a sufficient number of cases, and found that there exists no difference in the inhibiting power of patients suffering from cancer and from other diseases. Goldberger's method can, therefore, not be used in the diagnosis of cancer.

Of great theoretical importance are studies in the heredity of cancer. It is well known that investigations carried out by the statistical method in human beings have so far not given very decisive results. It is quite evident that cancer in animals, especially in mice and rats, is a very much more favorable field for the study of hereditary influences in the etiology of tumors. When I first described the so-called endemic occurrence of cancer among white rats, I pointed out that it might possibly be due, not to infection, but to hereditary influences. During the last two years we have given our attention to the heredity of cancer in mice. We have, in this problem, to distinguish between two lines of investigations. In the first place, we may analyze the hereditary influences which determine the inoculability of cancer. We know that certain strains of mice can be inoculated with a certain cancer, and that others cannot. Certain mice, therefore, represent a good, others an unfavorable soil for the growth of a certain tumor. Tyzzer examined the hereditary conditions of a particular tumor, using special strains of mice, and found very peculiar rules concerning the heredity of the inoculability of this tumor. He found, namely, that if a favorable and an unfavorable strain were crossed, the first hybrid generation forms a very favorable soil for the growth of his tumor, while the second and third generations are not receptive to the inoculation of the tumor which he used. We carried out similar experiments with another tumor, and with entirely different strains of mice, and found similar conditions to hold good in our experiments. Besides, we extended these investigations in various directions. We may, therefore, regard this peculiar kind of hereditary transmission of the conditions determining the inoculability of tumors as of general significance, and not restricted to one set of tumors or to special strains of mice.

Of greater significance than the study of hereditary conditions, favorable and unfavorable to the inoculability of tumors, is the study of the hereditary conditions influencing the origin of spontaneous tumors. Such studies we also began more than two years ago. These investigations are, however, of a very complex character, and necessarily have to extend over a number of years until definite results can be obtained. It will, at first, be necessary to study carefully various strains of mice in order to determine what the normal incidence of cancer in these various strains is. It is only after we have determined how great the liability is of certain strains of mice to be affected by cancer, and after we have selected a strain in which spontaneous cancer is frequent, and another strain in which it is rare or absent, that we can successfully solve the problem as to the significance of heredity in the transmission of spontaneous tumors. Our investigations in this direction are progressing, but have not yet advanced so far that we can make any definite statements. Our observations, however, seem to establish the fact that various strains of mice differ considerably in regard to the frequency of spontaneous tumors which occur among them, and we have found the interesting fact that there are certain strains in which all or almost all of the females of a certain age become afflicted with cancer of the breast. There are other problems, concerning the conditions determining the frequency of cancer in mice, which we are investigating on a larger scale and on which we hope soon to be able to give a more definite report.

We now turn to a subject of investigation which is of great interest from a theoretical point of view, and on which very much work has been done by many investigators, and in which, notwithstanding the great amount of work done, the principle facts are still in dispute. I refer to the problem of immunity in cancer. The most important question at issue is as follows: Does the growth of a tumor produce some reactions in the animal in which the tumor is growing, which lead to the production of immunity? Are antibodies of some kind produced? Ehrlich stated that the growth of a rapidly growing tumor prevents a second tumor, inoculated into the same animal at a later date, from growing. Some other investigators could not confirm this observation of Ehrlich. In order to clear up this and various other questions concerning immunity, we undertook with Dr. Fleisher an extended series of investigations in which we used a method which permitted us to approach these questions from a quantitative point of view. We graded the virulence of tumors through their exposure to a certain temperature during various periods of time, a method which was used by me first in my earlier investigations on rat cancer. These studies are finished, only in part, at the present time, but we are ready now to draw certain conclusions. We may state that the growth of a tumor calls forth a production of certain substances, or of certain mechanisms, which inhibit the growth of a second tumor. We may, furthermore, state that these reactions are of a quantitative

character. As Dr. Sale found, the larger the quantity of tumor inoculated, the stronger is this reaction. Also, the more virulent the tumor, the stronger the reaction. We may further state that this reaction is principally caused through the life and growth of the tumor, and cannot be called forth by the injection of dead tumor material. This applies to tumors which grow subcutaneously, and also applies to tumors, one of which grows subcutaneously and the other intraperitoneally; and although tumors inoculated intraperitoneally usually grow less actively than subcutaneous tumors, they nevertheless exert a distinct immunizing effect which also inhibits the growth of subcutaneous tumors. It has been established by a number of investigators that the inoculation of organs, like the spleen and liver, and even of blood-corpuscles, has an inhibiting effect on the growth of a tumor inoculated afterwards. It has been maintained by Levin and others that autolyzed tissue has a similar inhibiting effect on the growth of tumors in the rat. Dr. Marsh Pitzmann investigated the effect of autolyzed spleen on the growth of inoculated cancer in mice, and found that, while fresh spleen has a distinct preventive action on the growth of mouse tumor, autolyzed spleen is without any effect whatever. We must, therefore, assume that those substances of the spleen, which have an immunizing effect, are destroyed through the process of splitting which takes place during autolysis.

All these studies concern immunity in animals with inoculated tumors. It is a very interesting problem, whether mice with spontaneous tumors behave in a similar way as those having inoculated tumors. The first studies, analyzing the growth of spontaneous tumors in the animals in which they originated, were undertaken by myself, in 1901, in rats, and several years later in a dog suffering from a tumor of the breast. We found, at that time, that the animal in which the tumor originated spontaneously is a very much better soil for the growth of pieces of its own tumor than other animals of the same kind. This explains why an operator never becomes infected with a tumor while operating on a patient, though the patient himself not infrequently shows metastases in the wound. I also made experiments in order to determine whether animals, suffering from spontaneous tumors, could more easily be inoculated with spontaneous tumors of other animals than animals which are not suffering from spontaneous tumors. I could carry out only a few of the latter experiments at that time, but they seemed to indicate that mice afflicted with spontaneous tumors form a better soil even for the growth of spontaneous tumors of other animals than do normal mice. Later, Haaland and others confirmed the fact that the animals, in which the tumor originated, can be inoculated with their own tumors while other animals cannot. This investigator, however, came to the conclusion that animals which are bearers of spontaneous tumors do not form a better soil for the growth of transplanted pieces of other spontaneous tumors than do healthy mice. In conjunction with Dr. Fleisher we resumed our

studies in this direction on a larger scale, and our investigations, not only confirmed entirely, but extended our former conclusions. In a large majority of cases, we found that pieces of tumors, taken from an animal afflicted with a spontaneous tumor and inoculated into the same animal, grew. The same piece of tumor inoculated into other mice afflicted with spontaneous tumors grew only in a certain number of the animals inoculated, but grew in a considerably larger number of cases than if healthy animals, not spontaneously afflicted with cancer, were inoculated with the same tumors. We see then that animals, in which a tumor originated spontaneously, form a better soil for the growth of tumors than do normal mice. There exist, therefore, in animals with spontaneous tumors, certain constitutional conditions favorable to the growth of tumors generally. We are at present concerned in the further analysis of these conclusions which seem to us to be of great importance. Of the problems we are investigating in this direction, I shall mention only a few. Do the spontaneous and transplanted tumors have the same preventive action on the growth of a readily transplantable tumor? So far, our present investigations seem to indicate that this is not the case, and that spontaneous tumors do not exert, to the same extent, an inhibiting action as inoculated tumors. Spleen exerts also, in mice afflicted with spontaneous tumors, a preventive action of the growth of a transplanted tumor inoculated at a later date. All these investigations necessarily require much time for their completion. This is quite evident if we consider the difficulty of getting a sufficiently large number of mice in which spontaneous tumors occur.

We shall now leave this field of investigation and turn to another which is of more direct practical importance—that of the treatment of cancer. Let me say, however, that the principles which have to guide us in therapeutic experimental work are identical with those applying to investigations that are at first of a purely theoretical nature. We have to approach the problem, not primarily with the aim and intention of finding means that cure cancer, but to investigate how cancers are affected by various substances and to find the cause why various substances affect cancer in different ways. Notwithstanding our desire to help patients and our hope that these studies may ultimately lead to practical results in the treatment of patients, we must proceed, in our studies, apparently unconcerned as to whether the substance we try at first may be applicable in general practice or not. Here also the investigator is primarily concerned with principles rather than with the application of principles to individual cases. From a certain point of view it is of the greatest importance, in the early stages of such an investigation, to prove that certain substances have a definite effect on cancers, and it is at present of relatively less importance to show that this effect is sufficiently strong to eradicate cancer. As soon as the principle is established, that by the injection of certain substances cancer can be affected and a certain re-

trogression accomplished, and therefore the potency of these substances and the importance of such experiments be demonstrated, the problem which remains will be of a purely quantitative character—namely, to find such modifications which increase the activity of the substances used. The first step in our work is to establish the fact that there exist substances which affect cancer and what kind of cancer they affect. There remains then the second problem—namely, to increase their effect to such a degree that they become applicable in the general practice of medicine. These are the principles which guided us in our work, and from these points of view we undertook therapeutic experiments, within the last year, in conjunction with Drs. Fleisher, W. E. Leighton, H. N. Lyon, C. B. McClurg, and Sweek. The first work on patients was done with the assistance of Dr. Smith. We reported that we had found a substance which, after intravenous injection, caused a partial retrogression of many tumors. I now wish to give a brief summary of our investigations in this direction. Our main aim was to compare the action of certain substances on animal and human tumors. As far as we are aware, such a comparative study had not yet been carried out, although it seems to us to be of the utmost importance to know whether animal and human tumors react in a similar manner towards certain substances.

As is well known, about a year and a half ago, Wassermann found that repeated intravenous injections of an eosin-selenium preparation caused a necrosis or disappearance of a certain number of mouse tumors. Later, Neuberg and Caspary, and Løeche found that certain metal preparations had a similar, although apparently weaker effect. None of these investigators stated definitely the character of the preparations they used. In our work, which is still entirely in its incipient stage, we made use of two kinds of substances, first colloidal copper preparations, and, secondly, various albuminoid substances, as well as representatives of carbohydrates and lipoids, respectively. We found that the growth of tumors in mice, after several intravenous injections with colloidal copper solution, is inhibited during the time of injection. When the injections were discontinued, the tumor usually resumed its growth. The other substances we mentioned acted in the following way. One injection of a solution of nucleoproteid prepared from lymph-glands of cattle destroyed, in many cases, a great part of the tumor, but usually some peripheral parts remained alive. In other cases the destruction was less extensive. Solutions of casein acted in a similar manner. In many cases one injection destroyed the greater part of the tumor; in other mice a single injection was without effect. Repeated injections of nucleoproteid or casein inhibited, in the larger majority of cases, the growth of the tumor during the period of injection. Serum globulin, egg albumin, horse-serum, lecithin and starch seemed to be without effect. These are the principal results which we have obtained so far. As you see, we have been able to test only a relatively limited number of substances as to their efficiency,

and we may justly expect that a continuation of our investigations will lead to the discovery of substances which are even more effective.

Our experiences with patients are still more limited than those with animal tumors. So far, in patients we have tested only two substances: (1) Colloidal solutions of copper, and (2) various solutions of casein or of some derivatives of casein. As to the best mode of preparation of the colloidal solution of copper, I wish to state that at first we made use of the alternating current passing through carefully distilled water; later on we used a direct pulsating current. The latter produces a solution in which the particles of copper are much finer; and the injection of this solution causes, on the whole, less general reaction than the injection of the earlier preparation. As to the effect of these substances on human cancer we confirm our previous report—namely, that copper causes a partial retrogression of many tumors in cases that are not yet cachectic, where there are not yet extensive metastases, and where the tumor is not too malignant.

Both the substances we used, the copper as well as the casein, are in some cases active; which one is the more efficient we cannot state at the present time. In some cases we prefer the copper, especially in cases of patients who have resistant veins. In other patients in whom the veins are easily affected by repeated injections of the copper solution, we use casein preparations because they are much less injurious to the veins than copper. Most of the cases receiving injections were previously treated unsuccessfully by other means. The large majority of these cases were either inoperable or could only be treated surgically through a very grave and extensive operation. Our treatment causes, in suitable cases, a partial retrogression of sarcoma as well as carcinoma. We have had only one suitable case of sarcoma so far, that of a girl about seventeen years of age with a medullary sarcoma of the humerus, which had, as the Roentgen-ray picture showed, in all probability extended to the periosteum. The parents refused an operation and asked us to try our mode of treatment. Without promising any results, which, of course, we are unable to do in any case, we started the treatment, using, after a few initial injections of copper, intravenous injections of casein preparations. Roentgen-ray pictures showed, during a period of ten days preceding the commencement of our treatment, that a decided extension of the tumor had taken place. We may, therefore, assume that the tumor has been a fairly rapidly growing one. After approximately two months of treatment, the Roentgen-ray pictures, according to the judgment of physicians experienced in the interpretation of Roentgen-ray plates, and the palpation of the arm, indicated a very noticeable retrogression and partial calcification of the tumor. In the case of carcinomata we usually use now a combination of both substances. If possible, we start with a series of injections of copper and employ afterwards, either solutions of casein or, alternately, solutions of casein and copper. So far, this method has, in a number of cases, led to a slow

but continuous retrogression of the tumors. In a few cases in which the tumor was rather virulent, partial retrogression took place in the beginning to be followed later by a resumption of growth. These injections caused a partial retrogression of several carcinomata infiltrating the cheek and lips. One of these patients, who could not open his mouth when he was first injected, did not show any definite evidence of a tumor at the time he was discharged. What the fate of this patient was after his discharge, we cannot say. In several cases of rodent ulcer, even after they have become extensive, for instance, have destroyed an eye of the patient as in one of our cases under the influence of the injections of colloidal copper, growth of epidermis began to set in over a denuded area. In such cases the growth of the epidermis proceeded evidently from the remaining hair follicles. If, however, the ulcer had been so deep that the hair follicles had been destroyed, repair may take place by contraction of the neighboring parts of the skin, if such retraction is possible. Otherwise no healing can take place. In such cases we have occasionally observed an apparent growing out, from the base of the ulcer, of what appeared as granulations. But until the present these granulations have only been very slight in extent. The treatment caused a beginning retrogression of a tumor of the thyroid, of an extensive abdominal tumor, and a decided retrogression of a carcinoma of the uterus recurring after extirpation. The latter result was observed in a case in which the patient was still fairly strong at the beginning of the treatment. In two cases which were emaciated when the treatment was begun, and in one of which at least there were metastases present in the liver, no effect on the tumor could be obtained, although at least in one of these two cases the general condition of the patient improved. In the case of cancer of the thyroid the injections caused a partial retrogression of the tumor, and the breathing of the patient, which had been labored, became relatively easy after the first period of treatment. A case of multiple carcinoma of the face and neck is markedly improved as the result of the treatment. In some other cases a noticeable retrogression of lymph-glands with metastatic tumors, with and without a previous extirpation of the primary tumors, took place. I mention these cases as types of patients which received injections. In cases in which the treatment is discontinued before the tumor has disappeared, we have every reason to believe that the tumor will resume its growth.

We regard our work as only in its incipient stage, and we consider its significance to consist, at the present time, in that we have established the fact that mouse tumors and human tumors behave in a similar manner towards intravenous injections of various substances. The same substances cause inhibition of growth or partial retrogression of tumors in both cases; and, if we compare the doses given per kilo of body weight, we even find that the effect of these substances is relatively greater in the case of not too virulent human tumors than in the case of the ordinary transplantable mouse tumors. On the other hand, human beings are very

much more sensitive to the substances which we used, and can tolerate only very much smaller doses per kilo of body weight than those given to animals. It has been our main concern to establish these principles. We wish, however, to summarize here the difficulties encountered in the application of these principles to the treatment of patients. As we stated before, very virulent and extensive tumors cannot be induced to retrogress. Furthermore, very weak cachectic patients do not respond favorably; but even in relatively strong persons we find that, in some cases, frequent injections of the copper solutions cause pathological changes in the veins which are injected, and in the majority of patients injections of the copper solution can, therefore, not be continued indefinitely. A further difficulty in the application of this mode of treatment consists in the relative slowness with which the substances act that we use at the present time. Treating patients with these injections is at best a very tedious process, and, as stated, the gradual retrogression takes place very slowly. Furthermore, we see in many cases that, after the process of healing has reached a certain stage, an apparent cessation of the repair takes place. In some cases this is due to secondary conditions not directly connected with the cancer. In one patient, for instance, in which the healing had been apparently almost complete at the time of our first report, there remains an area which does not heal and this area corresponds, in the main, to a place exposed to the action of some putrefied exudate. As we said before, very deep ulcers, in which the hair follicles had been entirely destroyed and the margins of which could not be mobilized, seem not to respond at present to the treatment. On the other hand, the injections not only act beneficially on carcinoma of the skin, but also on certain other skin lesions with which the carcinoma is associated or which precede the latter. Furthermore, an intravenous injection of a small amount of a casein solution may be of diagnostic value and reveal the presence of deep-seated metastases, the presence of which could not be established by ordinary methods.

After all, we must take into consideration the fact that so far we have used only two substances in patients, and that it is very improbable that the first two substances which we used should represent the most potent ones which can be found. It may furthermore be expected that through continued investigations we may perhaps find means through which the secondary difficulties just mentioned may be overcome, and the thought may be entertained of the possibilities of a combination of our methods with other methods of treatment, especially treatment by radium and Roentgen rays. It seems to us necessary, in the interest of science and of practical medicine, to follow to the utmost these lines of investigation.*

*Since writing this report, we found that the intravenous injection of nucleoprotein, casein and probably also other albuminous substances may produce small necroses of liver tissue in the guinea-pig. This observation points to a possible danger in the use of casein solutions.

THE TREATMENT OF TYPHOID FEVER.

By O. H. BROWN, M. D., of St. Louis.

INTRODUCTION.

The writer's excuse for presenting a paper on the treatment of typhoid fever is that there is much of seeming importance in the medical literature of recent years on this subject, which is not embodied even in the better textbooks of the present day. It is generally conceded by those competent to speak, that the treatment of this malady rests upon the proper restrictions of the diet and upon hydrotherapeutic measures, largely to the exclusion of all else except such medicinal agents as are needed to combat the minor symptoms. The modern textbooks—even those of Osler, Dieulafoy, Struempell, Anders—recommend milk as the best article of diet for the typhoid patient. There is much argument that milk should, at best, compose but a small part of the diet. The writer is of the opinion that there is also much argument against the hydrotherapeutic measures that are ordinarily employed to combat high temperature. There has also been accumulated some knowledge regarding specific medication. These are the points that will be discussed in this paper in order to show the present status of the therapy of typhoid fever. For an excellent presentation of many of the features of the treatment of typhoid fever, which space forbids discussion in this paper, the writer can refer to no better article than one by Meara,¹ of New York. His estimable dissertation can scarcely be commended too highly.

THE PHYSIOLOGY OF TYPHOID FEVER.

The typhoid bacilli, it is generally believed, gain admission to the body with food or water, or other contaminated articles which come in contact with the lips. The organisms are swallowed, and, on account of their resisting power, they pass uninjured through the acid secretions of the stomach, and into the intestines where they find predigested food—an excellent culture medium. The bacilli proliferate and manufacture here, according to McFarland,² a mild diffusible toxin, which produces some injury to the mucous membrane. This injury facilitates the entrance of bacilli into the solitary glands and Peyer's patches. From here they pass into the lymph-channels and thence into the blood-stream, thus making typhoid fever a true bacillemia. Mallory³ demonstrated that the histological lesions were widespread throughout the body. The common practice of making blood-cultures for diagnostic purposes has conclusively proved that the bacilli are commonly found in the blood, even in

the late stages of the disease. Coleman and Buxton⁴ report that the bacilli have been found as late as the eighth week in the circulating blood.

There is normally present in the alimentary canal various substances—waste products incidental to digestion—which, if absorbed by the blood, exert a toxic effect, and which are usually not absorbed unless present in considerably more than the ordinary quantities, or unless there exists some injury of the alimentary mucosa. Theoretically, at least, it would seem that a part of the toxemia of the patient would come from the absorption of the ordinary toxic substances of the alimentary canal by reason of the injured mucosa. The growing of the typhoid bacilli upon the food-content of the intestines will add undoubtedly to the toxic substances existing there. The digestive powers of the stomach for protein and fats, according to Nichols⁵ who tabulated the results of a large number of workers, are decreased from the normal by not over 5 to 10 per cent. Shaffer⁶ states that Folin, in some unpublished experiments, found that in typhoid the absorption of carbohydrates was practically normal.

We conclude, then, that virulent typhoid bacilli in the unimmunized body produce (1) a mild diffusible extracellular toxin; (2) a potent intracellular toxin; (3) injury to the intestinal mucosa; (4) general bacillemia; (5) a toxemia, the result of the specific toxin and the other absorbable toxin from the alimentary canal; (6) a slight loss of digestive power; (7) a marked increase of the oxidative and heat producing factors of the body; (8) a hyperplasia of the lymphoid tissue of the body; and (9) complications which vary greatly and which cannot be discussed in this paper.

PROPHYLAXIS.

Lumsden, Rucker and Freeman,⁷ the committee on typhoid fever of the American Medical Association, reporting to the section on Preventive Medicine and Public Health at the 62nd Annual Meeting, 1911, say: "The prevention of typhoid fever in the United States to-day depends upon an improvement in the present method of disposing of human excreta. Until all the people can be taught that the most dangerous material with which they come in contact in their daily lives is filth from human bodies, and until their sanitary habits are so changed that human filth is prevented from reaching human mouths, the prevention of typhoid fever cannot be consummated." This report also commends the inoculation of dead typhoid germs for the purpose of immunizing against typhoid.

Foster,⁸ reporting on the value of antityphoid vaccination in the United States army, says: "Of 118 men in Company A, first batallion of engineers, 92 members were inoculated once. 52 of these were given a second, and 51 a third injection. 2 of the remaining 26 had had typhoid. This left 24 non-immunized against typhoid. After the return

of the troops from the Gettysburg manœuvres, 6 cases of typhoid developed, all among the uninoculated." All the members of the troops had been subjected to the same sanitation conditions. Wright⁹ as early as 1904 obtained in the British army in South Africa, during the Boer War, highly satisfactory results in preventing typhoid by inoculations of dead bacilli. Cayley¹⁰ inoculated the members of three sections of the Scottish Red Cross Hospital. An old vaccine was used on the members of one section. Five of these developed typhoid. None of the others became infected. The recent reports by Gosman¹¹ and others of the United States army show how thoroughly successful prophylactic inoculations against typhoid are.

The writer believes that he expresses the consensus of opinion of the better medical men of to-day by saying that prophylactic inoculations with dead typhoid bacilli have been proved to be successful in reducing the prevalence and mortality of typhoid fever, and should be administered to physicians, nurses and orderlies who are much in contact with the disease, and also to the soldiers and others who are assembled under conditions where the sanitation is apt to be deficient.

THE TREATMENT WITH VACCINES AND SERA.

The value of vaccines in the treatment of typhoid seems still to be in the balance. Some physicians claim excellent results from their use, while others have seen no benefit result from them. And others, still, think they are harmful. Petrushky,¹² in 1902, reported good results from the use of dead typhoid bacilli in uncomplicated cases of enteric fever when the remedy was given early in the course of the disease. He cautioned against this treatment, however, in the patients in the advanced stage of the disease. He gave small, gradually increasing doses, and the first dose was accompanied by some antityphoid serum. Semple¹³ used dead autogenous cultures and reported good results therefrom. He controlled the inoculations by opsonic determinations. Pescarolo and Quadroni¹⁴ used attenuated agar cultures of living typhoid bacilli, and reported a fall of temperature and a rapid recovery after these inoculations. These investigators claim their method to be entirely harmless, but say the injections should be given early.

Walters and Eaton¹⁵ report on 77 cases of typhoid treated in 1908. 31 of these were given typhoid vaccines early in the course of the disease; the other 46 were given the usual dietary treatment. The mortality percentage from the former was 3.2 per cent. and from the latter 11.1 per cent. Walters and Eaton claim that the vaccines shorten the duration and lessen the severity of the attacks. Nichols¹⁶ claims, from his use of the vaccines in typhoid, that "no effect on the clinical conditions, in the way of either improvement or aggravation of the symptoms, was definitely demonstrable." Richardson¹⁷ reported the results of vaccine treatment of 25 cases of enteric fever without encouraging results. He claims, how-

ever, that the treatment, when used in convalescence, is effectual in diminishing relapses. Emery¹⁸ is of the opinion that the treatment of typhoid fever with dead bacilli is still on trial. Anders¹⁹ reports the treatment by himself of 8 cases of typhoid, and summarizes the work of many others with vaccines with the following conclusions: "In the present state of our knowledge, the value of vaccines for the following purposes must be conceded. (1) As a means of prophylaxis; (2) in suitable cases when continued in convalescence to prevent relapses; (3) to combat local infections with the typhoid bacilli, as, for example, in bone suppurations, in the period of convalescence, and (4) for the removal of typhoid bacilli from the feces and urine in the case of typhoid carriers. Stone²⁰ has been able to bring about the destruction of bacilli in typhoid carriers by the use of vaccines. Meader²¹ was also able to exterminate the bacilli from a typhoid carrier by the use of vaccines.

Bassenge²² did some experimental work in which he found that a 1 per cent. solution of lecithin in distilled water has the property of dissolving typhoid bacilli, liberating the toxins in such a way that they seem to have a powerful effect in producing typhoid antibodies in guinea-pigs. Guinea-pigs were so immunized that they resisted twenty times the lethal dose of a virulent culture of typhoid bacilli. No reports have been observed of the use of these toxins in the human.

Chantemesse²³ has been using the antityphoid serum since 1892. Since 1899, he claims that his results have been entirely satisfactory. The serum is produced from the horse. On account of its high cost of production the serum has not been used extensively. Shaw,²⁴ Macfadyen,²⁵ Hewlett,²⁶ Goodall,²⁷ and Bruce²⁸ have also prepared antibacterial sera from the horse by injecting the thoroughly ground typhoid bacilli, and report that, in some of the cases in which the sera were used, good results were apparent. Rodet and Lagriffoul²⁹ have also made an antityphoid serum by the use of which they have been able to abort the disease in many instances, and in others the disease was shortened and made much milder. Bokenham³⁰ also prepared an antityphoid serum which protected rabbits from lethal doses of typhoid cultures. Bosanquet and Eyre,³¹ after summing up the results attained from the various efforts to obtain bactericidal sera for typhoid, conclude by saying, "experience at the present day is not very favorable to the use of an antibacterial serum in the treatment of enteric fever." The reason of the failure of these sera seems to be that they are bactericidal and not antitoxic.

Wassermann³² found that the bone-marrow and the lymphatic glands of immunized animals had protective properties. On this basis, Jez³³ has made an antityphoid extract by rubbing up in a mortar the tissues of the spleen, brain, lymph-glands, etc., of immunized rabbits, to which he adds normal saline solution, thus making an emulsion. He adds a

small amount of alcohol and carbolic acid, allows the extract to stand for a time, and then filters. This extract may be administered by the mouth or subcutaneously. Jez treated 18 cases with this material. All reacted with a fall of temperature, an improvement of pulse, and an amelioration of the general symptoms, and all recovered. Kluk-Kluczycki³⁴ confirmed Jez's results and states that the fever is usually reduced within twenty-four hours and an apyrexial state is often reached within three weeks. Eichhorst³⁵ has also tried the extract in 12 cases and was favorably impressed with the results. Du Mesnil de Rochemont³⁶ and Einhorn³⁷ also give favorable reports on Jez's preparation, but Pometta found it useless. Bosanquet and Eyre, summarizing the work on Jez's extract, say, "there is not sufficient information available upon the subject to enable us to form a satisfactory judgment as to its efficacy. The idea underlying it is not to be neglected, as Wassermann's experiments, confirmed by Jez, seemed to point to the existence of a protective principle in the organs of immunized animals." The writer suggests that, in addition to the organs, the blood should also be used in preparing the antityphoid extract. It seems reasonable that we may yet hope for an antibacterial serum for typhoid. It seems that little can be expected from the use of vaccines in typhoid except as outlined by the preceding quotation from Anders.

DRUGS WITH SPECIFIC EFFECT IN TYPHOID.

Only recently there has appeared a most modest and scientific article by Frazier³⁸ detailing sensational results in the treatment of typhoid with ipecac. Frazier took the ipecac treatment himself for tropical dysentery, with entirely satisfactory results, and, on this account, conceived the idea that the same treatment might be equally as efficacious in typhoid fever; consequently, he tried the treatment in 6 cases and reported his results in a recent issue of the *Medical Record*. The treatment was not administered in any case until after the diagnosis was made positive by the serum test. The ipecac was administered in salol-coated capsules in order to avoid solution of the ipecac in the stomach and the consequent nauseating effects of the drug. At first he gave one dose of 30 gr. in twenty-four hours. Later he gave this amount in divided doses. In his last two or three cases he gave 12 gr. doses every six hours. In the first case the treatment was begun on the sixth day and there was no fever after the ninth day. In the second case the treatment was instituted on the sixth day and there was no fever after the twelfth day. In the third case the treatment was begun on the fifth day and the temperature remained at the normal point after the ninth day. In the fourth case the ipecac was given on the fifth day and the fever was absent after the eighth day. In the fifth case the treatment was instituted on the seventh day and there was no fever after the tenth day. In the sixth case the treatment was begun on the fourth day, and on the seventh day the temperature became normal.

Whether Frazier was correct in his diagnosis in every instance or even in one instance, we cannot be sure. But if his diagnoses were correct in all or even in one of the cases he reports, his results are apparently marvelous. If the effects of ipecac on the typhoid bacilli are as decisive as he reports, we will not have to wait long for confirmation of his work. Vedder³⁹ found that a 2 per cent. solution of a fluid extract of ipecac inhibits the growth of the dysentery bacilli. The Shiga strain of the bacilli was more affected than was that of Flexner. Vedder, however, does not recommend the use of ipecac in the treatment of bacillary dysentery, as he thinks it would be difficult to give sufficient ipecac to make a 2 per cent. solution of it in the intestine. It seems, however, to the writer, as though there might be some virtue in using the ipecac, as the dose of ipecac administered would be mixed not with the entire content of the intestinal canal, but only with a few ounces of it, and, therefore, the strength of the ipecac solution might approximate that which would be destructive for the bacilli. What applies to the dysentery bacilli may very likely also apply to the typhoid bacilli, as the two types of bacilli are closely allied members of a common family.

THE INFLUENCE OF FOOD ON THE BACTERIAL FLORA AND TOXINS OF THE ALIMENTARY CANAL.

The alimentary canal with its predigested food material and its body temperature is an ideal culture bed and incubator for bacteria, and, as a result, the bacterial flora of the alimentary canal of an adult is a particularly rich one. For the purpose of the present discussion, these bacteria may be classed as proteolytic and fermentative. Kendall⁴⁰ says that in the infant, where there is a monotonous diet in which the proteid is in the minority and the carbohydrate a predominating portion of the diet, the bacterial flora is quite homogeneous. In the adult, however, where protein is quite apt to predominate in the diet, the bacterial flora is found to be heterogeneous. The reason for these two facts, according to Kendall, is that in case of the carbohydrates, the splitting products are few and simple, whereas those from protein are complex, numerous and varied in composition. Starting from these facts, Kendall planned a set of feeding experiments on animals in order to ascertain the influence of changes in the diet on the intestinal flora. The animals used were cats and monkeys. Two diets were alternated—namely, one of proteid and one of carbohydrate. The alternations were bi-weekly. It was found that the intestinal flora can respond to the changes in diet in two ways—namely, (1) the flora may become dominantly proteolytic, then fermentative as the diet is changed, and (2) in addition to the alternations in bacterial types, certain organisms can actually change their metabolism to accommodate themselves now to a protein, now to a carbohydrate regimen. These bacterial changes are demonstrable both by staining reactions and by the changes produced when the mixed flora are inoculated

into the media. These changes consist essentially of alternations between proteolytic and gas-forming bacteria on a protein diet, and acid-forming bacteria on a carbohydrate regimen. The absence of carbohydrate prevents the development of the acid-forming bacteria on a protein diet, and the excessive amounts of acid produced by the fermentation of sugar inhibits the growth of the proteolytic and aërogenic forms in the carbohydrate regimen.

In order to deduce the therapeutic applications from these experiments, Kendall cites several experiments to show how toxins of certain pathogenic bacteria—diphtheria, coli, and gas bacilli are altered by their facultative metabolism. Smith⁴¹ has shown that diphtheria bacilli attack carbohydrate preferably to protein when both are present in the culture medium. If carbohydrate is present in sufficient amounts, the bacilli produce an acid which may prevent further growth and comparatively little toxin is produced. But if only a small amount of sugar is present, the bacteria get a good start, but do not form acid enough to do themselves harm, and then they attack the protein and there is a marked production of toxin. Smith found that the same phenomenon is exhibited by the gas bacillus. Kendall says: "Many other organisms act in the same manner when they are placed in media containing sugar; the presence of sugar appears to prevent the breakdown of protein, at least of any considerable quantity." When the colon bacilli are grown in sugar-free protein broth, there results a disagreeable odor, a strong alkaline reaction, indol, skatol, aromatic acids and other products of protein putrefaction. And these compounds, it is well known, are toxic when absorbed; and when present in considerable quantity, especially when there is an injured mucosa, they are readily absorbed.

On the other hand, when the colon bacilli are grown in sugar-broth, the odor remains agreeable, the reaction acid, and in addition to carbon dioxide and water, lactic and small amounts of succinic and acetic acids will be found. The products of protein decomposition will be absent. This is a fermentative process, and only sufficient protein has been split to supply the nitrogen for the requirements of the bacteria. The chief feature to be observed is that the splitting products are of a non-toxic type.

Metchnikoff has recognized these facts in his treatment of acute auto-intoxication. His treatment consists in reducing the amount of protein in the diet and increasing the carbohydrates, and feeding with lactic acid bacilli to split up the sugar to form acid which will inhibit the growth of the ordinary proteolytic bacteria.

From these facts, then, it is readily seen that the character of the food taken into the alimentary canal will very profoundly alter the bacterial flora and the toxins of the canal. By way of résumé, if there is an excess of carbohydrate, the bacteria grow luxuriantly for a time, but they manufacture products which are inimical to their further growth,

and the specific bacterial toxin is less potent than when the bacteria are grown on protein alone. Whereas, the splitting products which the bacteria elaborate from carbohydrates are comparatively non-toxic to the human economy. On the other hand, when the protein predominates in the food and there is a small amount of sugar present, the bacteria grow luxuriantly, manufacture an extremely potent specific toxin, and produce from the proteins splitting products which are toxic when absorbed from the alimentary canal. The conclusions are that the diets for patients with intestinal infections, including typhoid, should contain a predominating amount of carbohydrates. Kendall is of the opinion that lactose answers this purpose as well as any other carbohydrate.

SUSTAINING THE WEIGHT OF THE PATIENT.

All will agree that the resistance of an individual is most likely to be the best when, other things being equal, the weight is approximately normal. Laboratory experiments, Shaffer says, have repeatedly shown that strong, robust, well-fed animals develop the highest artificial immunity. It is known that this particularly applies in the treatment of tuberculosis. The weight, in a great majority of patients, is a very exact indication of their conditions. The typhoid patient, when well fed, should develop immunity better than when starved.

The first question to be considered is, Are there contraindications to administering a sufficient amount of nutrition to maintain the body weight? If the food can be of such character as will not irritate the inflamed Peyer's patches and increase the possibility of perforation or hemorrhage, one serious objection will have been overcome. Theoretically, at least, this is possible by giving such a quality and quantity of food as can be digested, especially avoiding foods that require mastication to make then digestible. Shaffer and Coleman,⁴² after using a liberal diet in a large number of patients with typhoid, report that they have encountered, clinically, no serious objection to the use of a sufficient quantity of food to maintain a good state of nutrition. If some foods add to the patient's pyrexia by increasing the oxidative processes, these foods would be contraindicated; but if we can choose a diet that does not add materially to the heat production this contraindication will have been dissolved. Shaffer says protein is a great heat producer, whereas carbohydrate is much less active in this direction. This argues in favor of carbohydrates as being the logical predominating food for typhoid patients.

The next question of importance to be considered is, Can the digestive system of the fever patient reasonably be expected to handle the required amount of food to maintain his body weight? Nichols collected the statistics from the various observers who had studied this question, and he concludes that "in general, so far as shown by the data available, the average reduction of digestion during fever ranges not over 5 to 10

per cent. The belief in a great impairment of digestion in fever is an idea, based on vague impressions and dogmatic assumptions, that has come down to us from the dark ages." Shaffer says: "The experiments of von Hasslin, Leyden and Klemperer, Puritz, Folin and others show very positively that the average typhoid patient absorbs food from his intestine almost as completely as does the healthy individual."

The problem now to decide upon is in regard to the character of the diet, which should be given in order to maintain the body weight. In considering this question we should hold in mind that the 10 to 60 lb. which the typhoid patient may lose on a limited diet is at the expense—without considering water and salts, about which we know comparatively little—of his glycogen or carbohydrates first, his fats secondly, and his proteins thirdly. Physiologists have formulated the law that fats spare proteins, and carbohydrates spare both proteins and fats. Again we find support for the claim that carbohydrates are a necessary portion of the diet for typhoid patients.

But the question needs to be gone into somewhat further. When carbohydrates are oxidized, the major portion of the splitting products are carbon dioxide and water. Incidentally, small amounts of organic acids are formed, but these will have been oxidized to the simple end-products of carbon dioxide and water before elimination will have taken place. The carbon dioxide is eliminated without detriment to the lungs, and the water by the usual channels, and this acts not only harmlessly but beneficially.

When fats are oxidized completely the same end-products, as with carbohydrates, result as a rule, but as fats are not so readily utilized as are carbohydrates, the intermediary products—the fatty acids—are of more concern, and may argue seriously for bad in the patients economy. Shaffer suggests "that these acids may lead to varying degrees of acidosis with an abstraction of alkalies from the tissues, and possibly in other ways may be of distinct harm." He also adds that this is borne out clinically by the fact that fat people stand typhoid badly. Acetone and diacetic and beta-oxybutyric acids may result from the burning up of fats. In the digestion of protein, the main products formed are urea, uric acid, kreatinin, oxalic and aromatic acids. Acetone, diacetic and oxybutyric acids may also come from protein. These compounds, when present in small amounts, are slightly toxic, and they are eliminated very readily by a normal kidney; but, when there is an over-production of these bodies, there is likely to result serious toxemias therefrom. Particularly is this apt to be the case in the event that the kidney has received an injury, as is prone to occur in typhoid. From these facts presented, it becomes apparent that it is not directly important to maintain the carbohydrate equilibrium of the typhoid-infected body; it is, however, evidently of some importance to keep the patient somewhere near an equilibrium as regards his fat metabolism, and it is of extreme import-

ance that a protein or nitrogenous equilibrium of the patient be maintained.

As further evidences of the value of maintaining the protein of the body are the experiments of Wassermann and Jez, by which they show that it is in the cellular contents of the organs of the body that the antitoxin of a typhoid-immunized animal is found. Wells⁴³ says that the preponderance of evidence is in favor of the view that antitoxins closely resemble proteins. The conclusions from these facts are that proteins are to be especially spared because they are needed to maintain the body's resistance and to supply new immune bodies, and because an excess of the protein-splitting products are toxic to the body. The fat of the body should at least be spared from rapid oxidation, as the intermediary splitting products of these may be a source of harm if present in excess. The one advantage of adding fat to the diet would be due to the fact that they spare protein; but carbohydrates serve this purpose better than do the fats. The carbohydrates also spare the fats.

We must decide from this reasoning that the ideal diet for typhoid patients must contain a high caloric value of carbohydrates. To emphasize again the value of saving the proteins of the body, the following quotation from Stewart⁴⁴ is made: "The starving animal, as long as life lasts, excretes urea and gives off carbon dioxide, but its expenditure, and especially its expenditure of nitrogen, is pitched upon a lower scale. It lives penuriously, it spins out its resources; its glycogen goes, its fat goes, a certain part of its protein goes; and, when its weight has fallen from 25 to 50 per cent., it dies." Many typhoid cases are allowed to lose 25 or more per cent. of their body weight. Quoting from Stewart again: "When a sufficient quantity of starch or sugar is given to an otherwise starving animal, all loss of nitrogen from the body, except that which goes off in the urea still excreted, can be prevented. Of course, the animal ultimately dies, because the continuous though diminished loss of protein cannot be made good." From this reasoning, then, some protein should be added to the diet of the patient. Whether some fats should be added or not, it seems to the writer will depend very largely upon the amount of adipose tissue that the patient possesses.

The diet, which seems to answer the purpose most admirably, is that suggested by Shaffer and Coleman—namely, milk, cream, eggs, and lactose; lemon juice, tea, coffee, etc., to be used as flavoring agents. Their best results were obtained when the diets used contained in the neighborhood of 50 gm. of protein, 70 gm. of fat, and 800 gm. of carbohydrates in twenty-four hours, with the caloric value respectively of 200, 650, and 3,300. These values can easily be computed by referring to tables that give the caloric values of various food-stuffs.

Houghton⁴⁵ is so prejudiced against milk that he would exclude it entirely from the diet of the typhoid patient. He would substitute for it, toast, cream, gruel, rice, butter, soups, crackers, tapioca pudding and

sugar, with the latter predominating in amount. The writer has used, for the past year, a diet in which the carbohydrate, consisting chiefly of lactose, was the predominating element. He has also used glucose enemas. The results, for the most part, were quite satisfactory notwithstanding the imperfect manner in which the diets were ordinarily administered. The cases treated by him are so few that detailed reports will not be added.

It would seem from a theoretical standpoint, at least, that a soft cheese would be excellent for supplying the necessary amount of protein, and cheese would also supply a goodly amount of beneficent bacteria. As this diet is free from iron-containing foods, it would seem rational, as suggested by the editor⁴⁶ of the therapeutic department of the *Journal of the American Medical Association*, to give sugar of iron or tincture of iron chloride during the use of the iron-free diet. The writer believes in common with Shaffer and Coleman, Houghton, Lambert,⁴⁷ Kendall, Fussell,⁴⁸ Meara and others that a diet with carbohydrates in excess spares the patient's protein, reduces the patient's toxemia, and allows the patient to begin convalescence in a much better condition than he otherwise would. In this connection should be mentioned the value of using liberal amounts of water. The physician should give positive instructions to the nurse, requiring the administration of a certain quantity of water at specified intervals. A person can, with slight difficulty, be persuaded to take, as a rule, from two to five litres of water in twenty-four hours.

THE CONTROL OF FEVER.

Unquestionably, the control of fever aids materially in maintaining the resistance of the patient. Dieulafoy⁴⁹ says the cold bath may be regarded as almost a specific in typhoid. He classes it along with quinine in malaria and mercury in syphilis. He says that the cold bath is most efficacious if used at the very commencement of the disease. Struempell⁵⁰ also calls attention to the advantages of the cold bath, but he is less enthusiastic about it than is Dieulafoy. Osler,⁵¹ speaking about the value of the cold bath, says: "In general hospitals from six to eight patients in every hundred are saved by this plan of treatment. At the Brisbane Hospital, where F. E. Hare used it so thoroughly, the mortality was reduced from 14.8 per cent. to 7.5."

Even in the face of the foregoing statements from these world-famed authorities, the writer feels that often the bath is used too cold to the detriment of the patient, and that other measures may be utilized to a satisfactory end. The placing of the patient in a tub of cold water is a distinct shock; it requires handling of the patient, and the cold may cause such a constriction of the surface blood-vessels as will defeat the object of the bath.

As a substitute for the regular periodic cold tub bath, the writer would

offer what he chooses to call the continuous cold air bath. This consists of having the body of the patient very lightly covered and having the patient where the air is continuously changed. It is puzzling to understand why physicians and nurses will generally have no hesitancy in placing a fever patient into a cold bath, but will pile blanket upon blanket on the patient in bed whenever he complains of being chilly. It is a matter of common experience that people may habituate themselves to certain unusual external temperatures and feel consequently very miserable if this temperature is raised or lowered, and particularly is this true in the latter instance. We have all come in contact with people who kept their houses at 80° F. or more, and always suffered when compelled to stay for a few hours in another house with a temperature of even 72° F., or less. A fever patient feels more keenly a sudden lowering of the external temperature than do healthy people. He gets in bed, cold, and demands an excess of covering; and if a cool breeze strikes him he is chilly and wants, perhaps, more covering. The same thing occurs if an attempt is made to remove a portion of the covering. The writer has gone on the theory that a fever patient could be first made comfortable by an addition of the required amount of bedding, and then the covering could be so gradually withdrawn that the patient would become accustomed to the loss of covering and would not miss it. Sometimes the patient will complain temporarily when a little too much covering is removed, particularly if there is a cold, wintry breeze entering at the window. But within a few minutes, if the nurse is firm, the patient will be quite comfortable, or even more comfortable than before the amount of clothing was reduced. When a fever patient is heavily covered in bed, the clothing conserves the heat and the surface blood-vessels of the body are dilated and filled with blood. If too much covering is removed, or a cold bath is given, these vessels are constricted, and the blood and consequently the heat are driven to the internal organs, and the patient feels cold, but actually is hotter. Stewart says that, while there is a marked heat loss from immersing the body in cold water, there is also a marked production of heat, so that it has been found that a bath of cold water at 15° C. for two hours only lowered the axillary temperature 1°. But when the clothing that holds the heat is gradually and sufficiently removed, no change is induced in the surface blood-vessels, and the heat dissipation will begin just so soon as the covering becomes sufficiently reduced. According to Stewart, the cold bath of short duration produces a fall in temperature which reaches its minimum about thirty minutes after the patient has been taken out of the bath. After this the fever gradually returns to its previous level. The point to be remembered is that the dissipation of the heat, following immersion in cold water, is, at best, of short duration.

The heat dissipation from the continuous cold air bath, if properly managed, is not for half an hour or for an hour, as from the cold water

bath, but is continuous for twenty-four hours of the day. If a draft of cool air cannot be had from a window, an electric fan will serve admirably to keep the air in motion, thus carrying the heat away from the surface of the patient's light covering. This has a direct effect on the temperature of the patient. In some instances it may be advantageous to have the cool breezes play directly upon the patient's bare trunk. The legs and arms being smaller than the body, they are more readily chilled than the trunk. On this account, it is often necessary to have the legs and arms wrapped up, possibly with hot water bottles about them.

By this method the writer has had cases of typhoid and other fevers in which the temperature was kept at a constantly low level with little or no bathing. When it becomes necessary to give a cold water bath, it should be kept in mind that getting the blood to the surface is the essential feature of success. A hot bath will often succeed better in lowering the temperature than will a cold bath. The ideal bath for reducing the temperature is a sponge bath; warm at first, and gradually cooled, but using, all the time, friction with turkish toweling or rough material of that sort. The friction plays an important part in keeping the surface blood-vessels dilated. If a patient is kept in the cold air, the breathing of the cold air into the lungs is a material factor in dissipating heat. This treatment, which has been utilized so successfully in pneumonia, seems just as reasonable in connection with typhoid.

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While this article has been in the hands of the printer there have appeared a number of interesting articles on the treatment of typhoid. Below are given extracts of three of the more important ones.

Sicard,⁵² in concluding his article on "Further Experience with the High Culinary Diet in Typhoid Fever," uses these words: "The feeding of high fuel values shows a cleaner, moister tongue, more comfortable mouth, less offensive breath, less emaciation, less nervous exhaustion (which was shown by continuous muttering and constant picking at the bed-clothes), a cleaner, healthier skin, greater comfort, less diarrhea, probably lessened mortality, and fewer complications. The most evident features of the high culinary feeding are the sustenance of weight and nutrition, and the amelioration of hunger and the lessened tedium of convalescence."

The above quotation probably very nicely expresses the opinion of those among us who have been using the liberal carbohydrate feeding of typhoid patients.

Castellani,⁵³ working in Ceylon in 1904, made his first experiments on man, using live attenuated typhoid bacteria. He inoculated himself and fifteen of his co-workers. He believes that these cultures are harmless and give better immunization than do dead cultures. He uses non-virulent strains, and then attenuates these by heating for one hour at 50° C.

Johnson and Watt⁷⁴ report on a series of 65 cases of typhoid, treated with a milk free and a high carbohydrate diet. They had four deaths, all in cases practically *in extremis* when coming under observation. In the main, all their cases were of the severe type of the disease. The medicinal treatment followed was of the ordinary type used by most physicians of the present time.

SUMMARY AND CONCLUSIONS.

1. The ideal prophylactic treatment of typhoid is the proper disposal of human excreta. Inoculation of dead typhoid bacilli are of very great importance in preventing typhoid and should be used wherever there is suspicion of danger.

2. Inoculations of dead typhoid bacilli are of pronounced benefit in dealing with typhoid carriers and preventing relapses during the course of an attack of the illness.

3. A specific serum of practical value is yet to be found. The results thus far obtained are encouraging.

4. Frazier has recently reported that he aborted 6 cases of typhoid fever with large doses of ipecac administered in salol-coated capsules.

5. The diet in typhoid fever should consist of a small amount of protein, a small amount of fat, and a large amount of carbohydrate. The preferable protein food is milk and albumin water. The preferable fat is cream, and the preferable carbohydrate is lactose. A pound of the latter may be administered in twenty-four hours.

6. The above diet should reduce the grade of toxemia and should maintain the patient's weight, and should therefore increase his immunizing power.

7. The typhoid patient should be regularly given copious supplies of water. Cracked ice may be taken continuously during waking hours.

8. Pyrexia may often be controlled by keeping the patient in a cold room where the air is kept freely moving, and by keeping the patient very lightly covered. Arms and legs may require heavy covering.

BIBLIOGRAPHY.

- ¹ Meara (*Amer. Journ. Med. Sciences*, Vol. CXLI, p. 466, 1911).
- ² McFarland: Text-book Upon the Pathogenic Bacteria, p. 497, 1906.
- ³ Mallory (*Journ. of Exper. Med.*, p. 611, March, 1898).
- ⁴ Coleman and Buxton (*Journ. of Med. Research*, Vol. XXI, 1909. Ref. from Eshner's article on Typhoid, *Medical Record*, Vol. LXXX, p. 1022, 1911).
- ⁵ Nichols (*Amer. Journ. Med. Sciences*, Vol. CXLII, p. 95, 1911).
- ⁶ Shaffer (*Journ. Amer. Med. Assoc.*, Vol. LI, p. 974, 1908).
- ⁷ Lumsden, Rucker and Freeman (*Journ. Amer. Med. Assoc.*, Vol. LVII, p. 871, 1911).
- ⁸ Foster (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 1808, 1910).
- ⁹ Wright (*Practitioner*, p. 370, 1904).

- 10 Cayley (*British Med. Journ.*, February 9th, 1901).
- 11 Gosman (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 1169, 1910).
- 12 Petrushky (*Deutsch. med. Wochenschr.*, p. 212, 1902).
- 13 Semple (*Lancet*, p. 1668, 1909).
- 14 Pescarolo and Quadrone (*Zentralbl. fuer inn. Med.*, p. 989, 1908).
- 15 Walters and Eaton (*British Med. and Surg. Journ.*, Vol. XL, p. 509, 1909).
- 16 Nichols (*Washington Med. Ann.*, p. 293, 1909).
- 17 Richardson (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 255, 1910).
- 18 Emery: Immunity and Specific Therapy, p. 390.
- 19 Anders (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 2023, 1910).
- 20 Stone (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 1708, 1910).
- 21 Meader (*Bulletin Johns Hopkins Hospital*, September, 1911).
- 22 Bassenge (*Deutsch. med. Wochenschr.*, Vol. XXIX, p. 1257, 1908).
- 23 Chantemesse (*La Presse Méd.*, No. 86, 1904).
- 24 Shaw (*Lancet*, p. 948, October 3rd, 1902).
- 25 Macfadyen (*British Med. Journ.*, 1, p. 905, 1906).
- 26 Hewlett (*Proc. Royal Soc. Med.*, 1909).
- 27 Goodall (Bosanquet and Eyre's Serums, Vaccines and Toxines, p. 188).
- 28 Bruce (Bosanquet and Eyre's Serums, Vaccines and Toxines, p. 188).
- 29 Rodet and Lagriffoul (*La Presse Méd.*, p. 971, December, 1910).
- 30 Bokenham (*Trans. Path. Soc. Lond.*, p. 373, 1898).
- 31 Bosanquet and Eyre: Serums, Vaccines and Toxines, p. 190.
- 32 Wassermann (Bosanquet and Eyre's Serums, Vaccines and Toxines, p. 191).
- 33 Jez (*Wien. med. Wochenschr.*, p. 346, February 18th, 1899).
- 34 Kluk-Kluczycki (*Wien. klin. Wochenschr.*, No. 4, p. 84, 1901).
- 35 Eichhorst (*Therap. Monatssch.*, p. 115, 1900).
- 36 Du Mesnil de Rochemont (*Therap. Monatssch.*, p. 13, January, 1904).
- 37 Einhorn (*Medical Record*, p. 81, January 16th, 1904).
- 38 Frazier (*Medical Record*, No. 80, p. 923, 1911).
- 39 Vedder (*Bulletin of the Manila Medical Society*, March, 1911).
- 40 Kendall (*Journ. Amer. Med. Assoc.*, Vol. LVI, pp. 1084 and 1510, 1911).
- 41 Smith (*Journ. Amer. Med. Assoc.*, Vol. LVI, p. 1086, 1911).
- 42 Shaffer and Coleman (*Archives Internal Medicine*, No. 4, p. 538, 1909).
- 43 Wells: Clinical Pathology, p. 141.
- 44 Stewart: Manual of Physiology, 4th edition, pp. 461 and 465.
- 45 Houghton (*Amer. Journ. Med. Sciences*, No. 139, p. 38, 1910).
- 46 Editorial (Therapeutical Dep't., *Journ. Amer. Med. Assoc.*, Vol. LV, p. 1383, 1910).
- 47 Lambert (*Journ. Amer. Med. Assoc.*, Vol. LI, p. 987, 1908).
- 48 Fussell (*Amer. Journ. Med. Sciences*, No. 138, p. 526, 1909).
- 49 Dieulafoy: Text-book of Medicine, English Translation, 15th Edition. Vol. II, p. 1673.
- 50 Struempell: Text-book of Medicine, 4th American Edition, p. 29.
- 51 Osler: Practice of Medicine, 7th Edition, p. 100.
- 52 Sicard (*Medical Record*, March 22nd, 1913).
- 53 Castellani (*Lancet*, March 1st, 1913).
- 54 Johnson and Watt (*New York Medical Journ.*, February 1st, 1913).

PROPHYLACTIC MEASURES AGAINST EPIDEMIC
MENINGITIS.

By A. SOPHLAN, M. D., of Kansas City, Mo.

The recent floods in Western and Southern states, which were quite severely stricken with epidemic meningitis last year, are a warning to employ all known precautions against the occurrence or spread of the disease in the affected territory.

Epidemic meningitis is an acute infectious, contagious disease caused by the diplococcus intracellularis. The organism gains entry into the system through the nasopharynx in most instances, probably causing a primary nasopharyngitis. The bacteria are found in the nose and throat in over 90 per cent. of those ill with meningitis during the first six days of the disease. During epidemics a great many of the people, in some instances up to 70 per cent. of those who are exposed to the disease, harbor the organisms in their noses and throats for periods varying from days to months and years. These healthy carriers are not only a menace to others, to whom they may transmit the germs, but are in constant danger themselves, since a carrier may develop the disease at any time.

The most important predisposing agents for transmitting the germs from person to person are overcrowding, poor hygienic surroundings, exposure to cold and wet, and lowered general vitality. All these conditions probably exist in the present flood-stricken territory.

Preventive measures against epidemic meningitis consist most of all in removing the predisposing conditions described. Active prophylactic measures may be classified into

1. Quarantine.
2. Medicinal Treatment.
 - (a) Local.
 - (b) Internal.
3. Specific Treatment.
 - (a) Serum Prophylaxis.
 - (b) Active Vaccination.

1. *Quarantine*.—Quarantine is the most important measure in prevention, and should be very rigid if the disease breaks out in the flooded districts. Quarantine should include not only the sick, but also the healthy members of families in which the disease occurs. The period of quarantine arbitrarily should be at least ten days, during which time active prophylactic treatment should be instituted. If possible, quarantine should be controlled by cultures of suspected carriers, both the sick and healthy, and should be lifted only when the cultures become negative.

2. *Medicinal Treatment.*—(a) Local medicinal treatment consists of the application of antiseptic sprays, douches, applications by swabbing and inhalations to the nose and throat. Many antiseptics and sprays have been recommended, among them being hydrogen peroxide, iodine, guaiacol, chlorine water, pyocyanase, antimeningitis serum, and many others. In the writer's experience best results were obtained by preliminary gentle douching of the nose and throat with salt solution followed by spraying with $\frac{1}{2}$ to 1 per cent. peroxide solution. Under this treatment most positive meningococcus carriers become negative in from three to six days. (b) Internal Treatment.—Hexamethylenamine, in doses of from 20-40 gr. daily, is probably a very useful measure in that it is not only excreted through the nasal mucous membrane, but also into the cerebrospinal fluid. The drug should be taken in plenty of water so as to eliminate kidney irritation.

3. *Specific Measures.*—(a) Serum injected subcutaneously, in average doses of 10 c.cm., may be used temporarily as a highly efficient prophylactic. It acts in the same way as diphtheria antitoxin, or tetanus antitoxin, injected as preventives. Protection afforded by this measure, however, is only temporary, lasting about two weeks. Another objection is the fact that complicating, annoying symptoms of serum sickness often follow the use of serum. The sensitization of the patient to an alien serum which might possibly have to be used later for therapeutic purposes is undesirable, since it exposes him to the danger, remote as it may be, of anaphylaxis.

In those sensitized to serum, who later require serum therapeutically, a precautionary measure to prevent the severe symptoms of serum-anaphylaxis is to inject a small dose of serum, 1 to 2 c.cm., subcutaneously. If reaction occurs, wait till it has subsided, then one may go safely ahead and inject a larger therapeutic dose without fear of reaction. (b) Active Prophylaxis.—Active vaccination, such as prophylactic typhoid vaccination, presents an ideal preventive against infectious disease. By this means one stimulates the production of a high degree of active specific immunity which probably lasts for years. Last year the writer empirically introduced prophylactic vaccination against meningitis. The clinical experience with meningitis, the demonstration of immune bodies in the blood and cerebrospinal fluid of those suffering from the disease, and in the blood of those who have recovered, the ability to produce a highly immune anti-meningitis serum by immunizing small and large animals, indicated the rationale of this measure.

Toward the end of the Texas epidemic the writer undertook experimental study of this subject, assisted by Dr. J. H. Black, of Dallas. Experimental studies were made on a number of medical students who were repeatedly vaccinated with varying doses of killed bacteria. Their blood was carefully studied, and it was found that vaccination produced a high immune body content of all the vaccinated, as demonstrated by agglutination and complement fixation studies.

The principal objections to vaccination are the local and general reaction and the danger of the negative phase.

Local reaction consists of redness, tenderness and induration, lasting twelve to twenty-four hours. In the writer's experience, both the local and general reaction are, in most instances, much less pronounced than in prophylactic typhoid vaccination.

It is questionable whether the negative phase in healthy persons will ever be sufficiently pronounced to permit active infection to occur. Up to the present time several thousand people have been vaccinated, and in no instance has this occurred. In a number whom the writer has vaccinated, cultures of the nose and throat were positive and, after vaccination, became negative. The experience with typhoid vaccination among the many thousands who have been vaccinated, likewise indicates that the negative phase is not a real objection to the employment of prophylactic vaccination.

PARTIAL OPERATION FOR CARCINOMA INVOLVING THE JAWS, WITH REPORTS OF THREE CASES.

By WILLIAM T. COUGHLIN, M. D., of St. Louis,
Assistant Professor of Surgery, St. Louis University.

Ever since the writer has been able to formulate any idea whatever on the subject, it has seemed strange to him that surgeons, operating on carcinomata involving the jaws, dealt much more radically with an invaded bone than with soft tissues similarly invaded. For example, while being satisfied with cutting the soft tissues, say 1 to 3 cm. from the point of *apparent* involvement, the surgeon dealing with carcinoma attacking the bone in the same operation feels as a rule for some (to the writer) unknown reasons, that he must be far more radical, and in many cases sacrifices proportionately many times more bone than soft part. This, the writer thinks, is a needless procedure, and he has been examining bones removed for carcinoma with the idea of finding out, if possible, about how far from the apparent involvement lies the limit of safety. His studies so far, though yet far from being complete, still further strengthen his former conviction that many operations on the jaws are needlessly mutilating.

Because of the brilliant results obtained by Byrne in treating cancer of the cervix with the actual cautery, the writer has made it a rule to cauterize the wound with hot irons, after the excision of cancer of the jaw. His results, so far, satisfy him, and until he learns better, he will continue to use the cautery notwithstanding all theories to the contrary.

The results for partial operation for carcinoma in the mouth are better than those following radical operation (by radical operation, the writer means the removal of the whole jaw on the affected side, or of a complete segment of it); but that is only what one would expect, since those, in which partial operation is indicated, are naturally in an earlier stage and so are more favorable cases. But the writer believes there is more shock with the radical operation. Certainly there is more deformity and more loss of function, and there is surely more hesitancy on the part of the patient in accepting operation. Hence, the thought must be that the radical operation is done too often.

Just when to be radical and remove the whole jaw or a large section of it, it is not yet possible to state. The outlook in carcinoma of the jaws is bad at best, but the writer does not believe it is necessary to remove proportionately more of bone than of soft parts. He has found nothing in the literature to cause him to believe that the bone is propor-

tionately more involved than the soft tissues, and so far his studies of sections and jaws removed lead him to believe that extension is if anything slower in the bone.

The need for early diagnosis of cancer about the mouth and the necessity for early surgical intervention should be emphasized here. There is no other form of treatment that offers any hope for prolongation of life. It is surprising how often cases are referred to the surgeon too late in the disease for operation to be at all beneficial. The writer has recently refused operation in a case which had been under the care of dentists and doctors alternately, for about seven months before finally

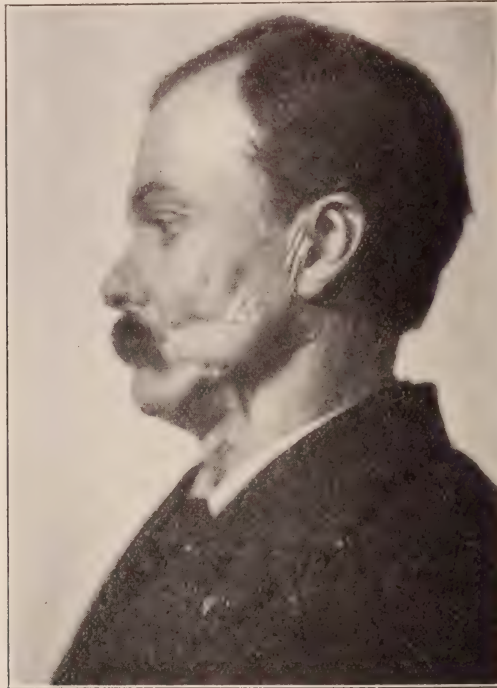


Fig. 1.—Case III. Side view, showing reconstructed cheek. Hollow under jaw following removal of glands and fascia.

seen by some one who recognized the condition, and advised surgical treatment.

If a patient over forty has a chronic ulcer in or about the mouth, *suspect cancer*. Remove all possible sources of irritation such as jagged teeth, bad plates, rough or short pipe-stem, etc., keep the ulcer clean, and either have the Wassermann test made, or give antisyphilitic treatment until satisfied it is not luetic. Any ulcer that does not show signs of healing under full doses of potassium iodide and mercury, after three weeks' treatment, is *not* syphilitic. Then insist on making a section of the

edge of the ulcer. Remove a small portion, securing both healthy and unhealthy tissue, and have the same examined microscopically by a competent pathologist.

To reiterate, a large number of curable cases of cancer in and about the mouth are allowed to become incurable under that much-to-be-condemned process called 'careful watching.' The case mentioned is one in point. Only too often one hears the expression: "Why not try such and such a remedy and give the patient a chance?" This may be gratifying to the patient, but it just means, "Let's give the cancer a



Fig. 2.—Case III. Front view, mouth closed. Moustache conceals slight deformity of angle of mouth.

chance." If you do want to give the patient a chance, make an early diagnosis and institute thorough surgical treatment at once.

In two of the following cases (Cases I and II) complete removal—in the one case of the whole lower jaw, and in the other the whole upper jaw, according to the patients' statements—was advised by other surgeons. The third case had consulted no surgeon; otherwise, beyond a doubt, the same story would have been told, since it was the worst of the lot, and because, as has before been stated, it seems to be the *custom*, if the bone be *apparently* involved, to remove it completely, or a complete and long section of it, and this the writer believes is unnecessary.

CASE I.—J. H., *et.* fifty-two, laborer, German, single. No history of lues. Family history good. General health always good. Chews and smokes, and drinks both beer and whiskey moderately.

Nine months ago a sore appeared in upper jaw just behind the incisor teeth on left side of middle line; it at first was a small hard lump, and in a month or so began to ulcerate. It has continued to spread more to the left than to the right, and also appeared on the outer surface of the gum in the incisor region; it is painful, and has been more or less so from the beginning. Patient has lost 23 lb. in weight. His normal weight is about 140 lb.

There is an elevated ulcerated area on labial surface of the gum in the incisor region. The ulcer extends to the right as far as the lateral incisor. The left incisors are loose, and the growth involves the gum at their roots and ex-

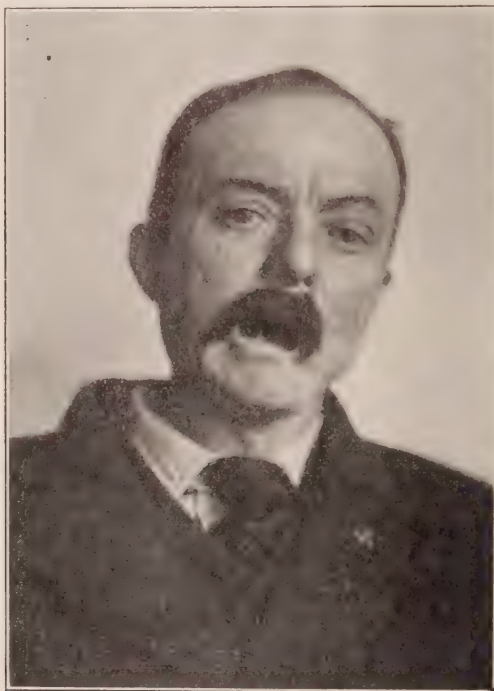


Fig. 3.—Case III. Showing extent to which mouth can be opened.

tends to the canine space (the canine tooth is missing). The ulcerated area extends back from the left incisors on to the hard palate for at least one inch from the teeth, and crosses the median line.

With a probe the bone can be felt in the ulcerated area though the same is not visible. The floor of the ulcer is red and granular, and here and there are whitish specks. The edges of the ulcer are hard and raised. The glands in the neck are not palpable, nor is the gland over the parotid. A section was removed for microscopical examination, and a diagnosis of epithelioma returned.

The patient was given two days' preparation; the operation was done under ether; the incisions were all made about 2 cm. from the apparent edge of the growth, and with a mallet and chisel the anterior part of the alveolar and palate processes of the superior maxillæ were removed. A lesser portion of

both these processes was removed on the right than on the left; both antra were opened, the wound was thoroughly seared with an iron at dull red heat. A week later the left side of neck was attacked, and all lymph-glands in the anterior triangle, from the base of the skull to the clavicle, removed. The submaxillary gland was also removed. Patient was advised to have the right side of neck similarly treated, but has not done so. The glands showed metastatic deposits.

Patient was operated upon February, 1911, at Washington University Hospital, and is still well and free from any sign of recurrence. This is a case in which complete removal of the maxilla had been advised by two other surgeons.

CASE II.—W. S., merchant, *at.* fifty-two, German; healthy, large man. Chews steadily, no smoking; moderate drinker. Sore appeared in lower jaw, left side behind last molar, six months ago. Has been treated by dentists and doctors. Lately consulted surgeon who advised removal of the whole jaw-bone for cancer. Consulted June 7th, 1911.

There is an ulcer on gum behind lower third molar and extending over on to outer part of anterior faucial pillar. Ulcer size of nickel. Hard edge. Floor of ulcer covered with blackish slough. Says he has had a chew of tobacco lying over this spot for over twenty years, except while eating.

Microscopic diagnosis confirmed the clinical one: squamous-celled carcinoma. Operation, June 10th, 1911, at Rebekah Hospital. It was decided to do the mouth work first. The cheek was split back from angle of mouth to anterior border of masseter to obtain access. The incision in the soft parts extended outward on to the cheek for $\frac{3}{4}$ in. from edge of ulcer, inward to and including half the left half of tongue, backward to posterior pillar of fauces, upward to and including outer half of soft palate, forward to first molar; all molars and bicuspid (left) were removed, the tonsil, of course, was included within the incision. With heavy rongeur the cancer-bearing portion of the bone was cut out and also the coronoid process and anterior half of the ascending ramus removed. The alveolar process and upper half of the body of the jaw were similarly dealt with as far forward as the second bicuspid socket. The iron at reddish heat was applied to the bone and raw surface from which the cancer had been removed. Next the anterior pillar of the fauces, the tonsil, part of the palate and tongue were cut out, and the iron applied as before. The cheek wound was closed. Two weeks later the glands of left side of neck and the neighboring fascia were removed from the clavicle to the base of the skull. The submaxillary gland was removed. Union in neck was *per primam*. The upper glands showed cancerous deposits, and in one gland there was an abscess which broke during operation. The patient died early in January, 1913, of empyema of the gall-bladder and general peritonitis. A post-mortem examination with microscopical examination of specimens showed no sign of new growth in any of the internal organs or glands, and there were no macroscopical signs of recurrence in the jaw, mouth, face or neck.

CASE III.—T. S. S., *at.* forty-seven, roofer, Irish. Lues twenty-five years ago. Two weeks' treatment. Married; healthy children; no miscarriages. Family history good; chews and smokes; drinks both beer and whiskey. General health always good.

Nine months ago sore appeared on the inner surface of the left cheek, near the angle of the mouth, and soon grew on to both lower and upper lips. Two months later swelling appeared in left cheek, hard and painful. This grew for five months and then ulcerated. Has a good deal of pain in lips and cheek. Has lost about 15 lb. in the last three months. There is an ulcer with raised edges and foul sloughing base with many white granules thereon at

the left side of mouth, involving about one-third the lower and one-quarter of the upper lips. This extends across the lower buccogingival sulcus, and involves mucoperiosteum on the outer side of the lower jaw to the teeth in the canine and premolar region. Lower canine is rough and jagged. There is a hard, round lump as large as a small English walnut in left cheek, about midway between angle of mouth and point where anterior inferior angle of masseter meets the lower margin of the jaw. This nodule is perforated and ulcerating through its centre, a fistula existing. A very foul odor comes from the patient's breath.

Glands under left side of jaw are palpable, one feeling very hard, but they are painless. A microscopical section confirmed the clinical diagnosis of carcinoma and showed that of the epidermoid type. Patient was advised to have operation performed.

On entering hospital patient was given our usual routine treatment for all operations on mouth.

The line of the proposed incision was drawn in order to estimate the size of the flap needed. Such a flap, allowing for shrinkage, was now outlined on the left side of the neck over the anterior triangle and the sternomastoid, its base being in the paroto-masseteric region at the angle of the jaw. The flap with subcutaneous tissue and platysma was dissected up. It was covered with hot saline cloths which were renewed often enough to keep it warm. The glands in the anterior triangle were removed from the clavicle to the base of the skull. The submaxillary gland was removed, and after wide undercutting, the defect in the neck was closed. It was rather tight, and because of cyanosis of face a vertical incision was made in the middle line in front and the patient raised to half-sitting or a little more. The growth with about 2 cm. of apparently healthy tissue was removed. The resulting defect in the cheek reached from just below the malar to lower edge of jaw and from massetero-mandibular angle to midline of lower lip. All the teeth in that side of the lower jaw were pulled. The mucous membrane on the inner side of the jaw was incised along the base of the alveolar process. The periosteum was incised on the outer side of the jaw about 2 cm. away from the apparent edge of the growth. The alveolar process was removed with rongeur until the tooth-sockets could no longer be seen, and also the outer table of the jawbone for about the same distance—namely, from central incisor to third molar region. The iron at a dull red heat was applied to the wound in the bone and the raw surface well charred. The flap was thrown into position and sutured. The lower lip had to be undercut beyond the right angle of the mouth and an incision made outward into the cheek for 2 cm. at the right angle of the mouth. On lowering the head the patient became alarmingly cyanosed and stopped breathing, and was therefore placed in bed on a back rest. There was not much shock. He suppurated, but left the hospital in two weeks. Two fistulae persisted, but they have since been closed. He is free from any sign of recurrence, and the deformity and loss of function are slight. (See Figs. 1, 2, and 3.)

This case was operated upon at Rebekah Hospital early in June, 1911.

SOME PROBLEMS IN THE ETIOLOGY OF PELLAGRA.

By EDWARD J. WOOD, M. D., of Wilmington, N. C.

By rights the pellagra problem should occupy about the same position as was held by the syphilis problem a decade ago. At that time it was acknowledged that syphilis was an infectious process, but the specific organism had not been discovered. To-day, in the study of pellagra, the first problem should be one of classification. To many, the reasons are as numerous and as convincing as in syphilis that we are dealing with an infectious disease. The pathological changes in pellagra point strongly to an infectious process due to an animal parasite. There are a number of points of similarity between the pathological changes of pellagra and that group of diseases, chief among which are syphilis, trypanosomiasis, and kala-azar. The most important of these changes are increase in the mononuclear elements of the blood and perivascular infiltration of the tissues. The very definite seasonal recurrence is very distinctive of a parasitic disease of this variety. If the disease were due to a bacterial parasite, it would appear that the direct inoculation of blood from a pellagrin into another individual would be followed by the disease. Such does not occur, recalling the experiments done with yellow fever. It seems that a requisite is an intermediate host. The writer has known a man, who never ate corn food of any kind, to die of the disease and his wife to become affected in a year. In one house 6 cases were found and in another 4, while there were no more cases in that section. It is a notable fact that the occurrence of a number of cases in one house is not unusual. The zeist would argue that the reason for this is the common cause of eating the same food. This can be readily discarded, for the very reason that the same barrel of meal supplies many families in the particular neighborhood in which it is sold, and the writer was in a position to know of every case of pellagra in the town. It was a notable fact that the disease would occur in a house and be the only house in the neighborhood having any cases, though the same shop supplied fifty or more families in the immediate vicinity. There has never been proof of the infectiousness of pellagra, and in the present state of our knowledge quarantine would not be in order.

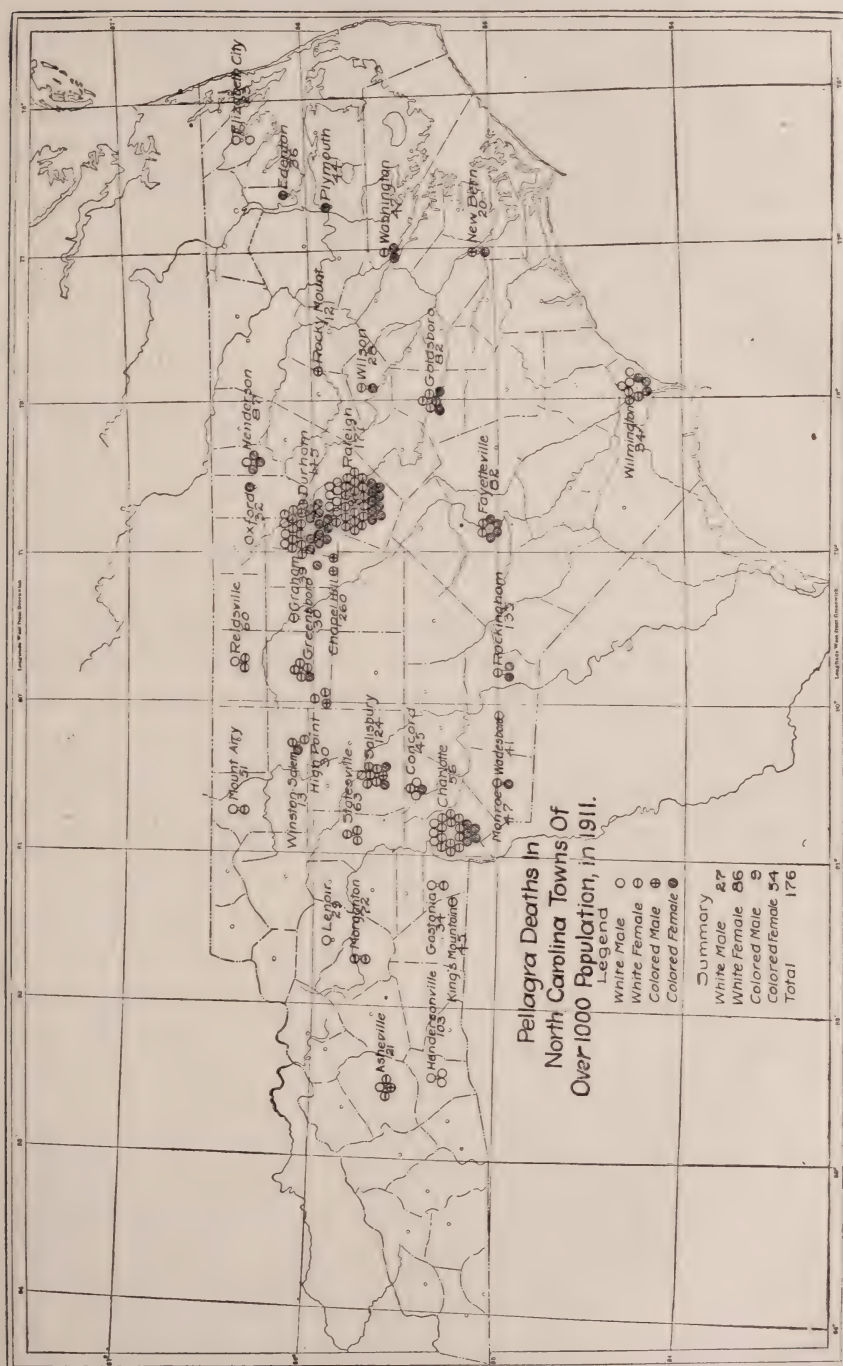
The corn theory is so palpably insufficient that it becomes irksome even to consider it. How can pellagra be caused by corn in any infant, three or four months of age, whose parents were not pellagrins and the child was exclusively breast fed? How could a man in Connecticut, who had never eaten corn food and had not been out of the state for many years,

advocates of the corn theory explain the large number of cases observed in individuals who were not consumers of corn? It is likely that they would hide behind the bogey of 'pseudo-pellagra.' After the careful observation of a large number of cases, over a period of seven years, the writer defies anyone to disprove the correctness of the diagnosis or to place on sure scientific basis the existence of such a condition as 'pseudo-pellagra.' Manson points out that the term 'pseudo-pellagra' was coined by advocates of the corn theory, who otherwise could not have defended their position. It is a clear case of fixing a theory of etiology and forcing the clinical manifestations to conform thereto.

The writer feels confident that in the course of time it will be conclusively shown that pellagra existed in Europe long before Indian corn was first heard of as a food. There are many evidences that the accepted be the victim of pellagra if corn is the exclusive cause? How can the date of the introduction of corn into Europe be inaccurate, for Savonarola many years before gave an account of the best manner in which this food should be prepared. When one recalls how recently typhus and typhoid fevers, were separated, and how few points of similarity really existed, it is not surprising that pellagra might have been confused with some other condition. This is all the more reasonable to the writer who has seen definite cases of pellagra sent to Hot Springs, Ark. for treatment for syphilis. Until recently many cases of pellagra in the insane institutions were diagnosed dementia paralytica and the skin lesions were counted merely as a trophic disturbance attending this disease. Sprue, described and added to the classical account, was a description of a peculiar skin condition on the backs of the hands. It seems only reasonable that if such confusion can exist to-day, there was more justification for it early in the eighteenth century.

The inanition theory of pellagra is untenable, for the simple reason that pellagra is no respecter of persons, affecting the robust as readily as does any other infectious disease. The writer recalls scores of cases in individuals who were types of physical well-being. It is a fact that pellagra often is the terminal condition in extreme old age, that it often becomes engrafted on tuberculosis, that it is frequently seen in frail neurotic individuals; but it can be truly stated that it does not select the frail, depleted specimen as often as does tuberculosis.

Of course, as would be expected, the uric acid diathesis has been again called on to play the part of the scapegoat and another victim has been added to its shrine. A disease with as definite a course, with such definite pathological changes, with such a well-defined geographical distribution, and with such a fully proved recentness in American medicine, can hardly be counted any but a definite disease entity with a specific cause, though yet unproved. Like malaria in certain sections, the uric acid diathesis has often been put to service by the quack to cover a multitude of ignorances, but in the case of pellagra it is certainly most far-fetched.



Map showing pellagra deaths in North Carolina towns. (Prepared for the author by the North Carolina Board of Health.) From E. J. Wood's "A Treatise on Pellagra," by courtesy of the publishers, D. Appleton and Company.

The theory that certain semi-drying fats, of which cotton-seed oil is a type, cause pellagra seems hardly worthy of consideration. As a rule, the hydrocarbons are especially helpful to a pellagrin. It has been a custom of the writer to use cotton-seed oil in certain conditions, where indicated, in place of cod-liver oil, so often badly borne by the digestive apparatus, and olive oil, so often adulterated or beyond the reach of the poor. This custom will not be abandoned for fear of pellagra, for the reason that this oil cannot be connected in any way with the invasion of this country by pellagra in 1907. That year neither marked the introduction nor the unusual increase in the consumption of cotton-seed oil in the South. Pellagra appeared in institutions where the dietary had not been changed in a quarter of a century.

By far the most important features of the disease, from the standpoint of a study of the etiology, are the geographical distribution and the greater prevalence among women. It had never occurred to any student of the disease to consider the geographical distribution as a matter of importance, until that brilliant investigator, Sambon, suggested it to the British Medical Association in 1905. His work has been of the greatest importance regardless of the correctness or incorrectness of his theory. Certainly his view of the matter is the most logical and comes nearer conforming to the real conditions than any other. The definite seasonal variation, the yearly recurrence, the pathological changes, naturally lead one to turn to an animal source of the disease; and, when one again compares the condition with trypanosomiasis, the impression is strengthened. Sambon found that the only biting fly in pellagrous localities was the *Simulium*. Careful investigation made by him and his followers proves invariably that, if pellagra was found, the *Simulium* could also be found, and conversely. Time after time he predicted that a certain community would be found infested with the disease, basing his opinion on the presence in the streams of signs of the particular host. Invariably he was right. On one occasion when the geographical position was not suitable and no flies were found, the disease was discovered; but it was easily determined that it was contracted by certain field laborers who were in the habit of visiting certain pellagrous regions during certain seasons to assist with the crops.

In North Carolina one will see from the map that the state lies parallel with the Atlantic ocean and stretches out all the way to the highest points of the Appalachian system, having both sea coast and the highest mountains east of the Rockies. The result of this geographical lay of the land is such that it makes conditions ideal for a comparison of Sambon's findings in Italy. From the accompanying map it will be found that the few cases of pellagra, occurring on the coast, are sporadic. In Wilmington the prevalence may be explained by the fact that it is the largest city in a large territory and a hospital town whose physicians from the beginning have studied the disease considerably. Many of the cases in this town are from a distance and in many others it could be

definitely determined that they were frequent visitors to the country. It can be truly declared that eastern North Carolina has very little pellagra. From first hand knowledge the writer knows that in the high mountainous sections of this state the disease is equally as rare as on the coast. In Asheville the hospitals have had a few cases gathered from a number of neighboring counties. The real home of pellagra in North Carolina is the Piedmont section along swiftly flowing streams. In large measure, the towns of this section have grown up along the streams where the water power has been found necessary for the various manufacturing industries, chief among which is the manufacture of cotton goods. It will be seen that many cases have occurred in the towns of Raleigh and Durham. In both these places the conditions are ideal for the *Simulium* fly. This fly, as shown by Sambon, is a field pest which lays its eggs only in aeriated water. These eggs, when placed in stagnant water, died within a few hours. It was found that this fly would not lay in torrential streams, but always preferred just such streams which we have in this section of North Carolina. It will be seen that the distribution of pellagra, therefore, conforms exactly to the life history of this fly. It has been claimed that this fly did not occur in this country, but this statement is being daily disproved. In Kansas the insect was found in great numbers. In the museum at Raleigh, North Carolina, there is one specimen of the *Simulium*, but we know little of its prevalence or distribution at this time. The cattle people, however, are thoroughly familiar with the fly, variously known as the buffalo fly, the turkey fly, and other names of like character. A description of this fly always brings forth an immediate recognition. This fact does not settle the question of the species nor does it scientifically fix the genus, but it is one point in evidence. Sambon claimed that it was the *Simulium reptans* which was the fly in question. It seems likely that this must be modified owing to the fact that this species is unknown in the United States, while the *Simulium vittatum* is frequently encountered. The writer would be disposed to think that the hypothesis of Sambon was entirely too far-fetched but for the fact that the distribution of pellagra so exactly conforms to the kind of water and land which is invariably selected by the *Simulium*. It is claimed that there is no *Simulium* in many places where the disease frequently occurs. It should be remembered that in order to refute Sambon's hypothesis, it must be shown that the sufferer never frequented the country sections where there was rapidly flowing water. What city dweller does not visit the park, at least? It is a well-known fact that in North Carolina, at least, pellagra is violating one of its own laws in occurring in the cities, but this cannot be used as argument against the *Simulium*, because in this state the cities almost without exception are on or near some stream answering the *Simulium* requirements, and none of our cities is so developed as to exclude this fly. It should be remembered that the fly is a cattle pest and may easily be brought into the cities on the animals for slaughter.

No satisfactory evidence has been brought forth showing that the bed-bug is the carrier of pellagra, though there are those who hold to this belief. This would not explain the geographical peculiarity of the disease, and this one peculiarity should never be lost sight of, for on it we have one of the few really thoroughly established points of exact knowledge.

The second point of exact knowledge of pellagra is the fact that women are much more frequently attacked than men. This would, in a measure at least, detract from the Simulium, for the reason that this fly, as already mentioned, is a field pest, and therefore the men should be more exposed to it than women. This fact, together with the fact of geographical distribution, must be read aright so that we may profit thereby. Had the swamp, the night air, the greater prevalence on the first floor of the house been read aright, the malaria question would have been settled long before the time of Laveran or even Mitchell, the elder. The fact remains for the student of this strange malady to ponder upon, that it has been the invariable experience of every observer, who has seen more than a handful of cases, that the female is the more ready victim.

The question of the relation of the negro race to pellagra is most interesting. It cannot be said that they stand the ravages of the disease any better than the white race, but certainly they are not so often affected. This fact is of immense value in refuting the corn theory, for the negro is most improvident and when hungry will eat anything; as corn is the cheapest and 'spider bread' may be prepared in ten minutes, this is the food of choice with many. On the other hand, a large portion of the field labor of the South is negro. How then does he escape the Simulium if it be a field pest? Certainly one reason is that he is not so often the victim of uncinariasis which is the greatest lowerer of resistance to be found in any land.

This whole question of etiology is one of the most interesting and important before the medical profession, and offers a splendid field for the investigator. The ground is so new that the inexperienced worker has as great advantage as the experienced. In order to clear the field and leave the matter open to a solution, it is to be sincerely hoped by all interested that the bigot will remain silent. If his corn theory had been sufficient, it would have been accepted long ago, just as the cause of ergotism and the cause of malaria have been accepted. Who doubts a thoroughly established scientific fact? How many are there to-day who believe that the bacillus of Lustgarten or the bacillus of malaria are the cause of the respective diseases? A theory, that does not fulfil the requirements, has no chance of acceptance, while, it may be safely said, that a truth will not long be rejected.

If the investigator will carefully weigh the clinical evidence and will remember that a disease of unknown etiology had best be classified on a pathological basis, much will be accomplished.

MEDICAL AND SURGICAL PROGRESS.

SOME RECENT LITERATURE ON THE INHERITANCE OF NERVOUS AND MENTAL DISEASES.

By SIDNEY I. SCHWAB, M. D., of the Editorial Staff.

1. Davenport: The Trait Book. (Eugenics Record Office Bulletin, No. 6.)
2. Davenport: The Family-History Book. (Eugenics Record Office Bulletin, No. 7.)
3. Davenport and Weeks: A First Study of Inheritance in Epilepsy. (Eugenics Record Office Bulletin, No. 4.)
4. Rosanoff and Orr: A Study of Heredity of Insanity in the Light of the Mendelian Theory. (Eugenics Record Office Bulletin, No. 5.)
5. Cannon and Rosanoff: Preliminary Report of a Study of Heredity in Insanity in the Light of the Mendelian Laws. (Eugenics Record Office Bulletin, No. 3.)
6. Flood and Collins: A Study of Heredity in Epilepsy. (*Amer. Journ. Insanity*, January, 1913.)
7. Cotton: Some Problems in the Study of Heredity in Mental Diseases. (*Amer. Journ. Insanity*, July, 1912.)
8. Mott: The Hereditary Aspects of Nervous and Mental Diseases. (*Lancet*, October 9th, 1910.)
9. Mott: Inborn Factors of Nervous and Mental Diseases. (*Brain*, November, 1911.)
10. Savage: The Presidential Address Delivered at the Opening Meeting of the Section of Psychiatry of the Royal Society of Medicine on October 22nd, 1912. (*Journ. Mental Science*, January, 1913.)

Since the establishment of the Eugenics Record Office at Cold Springs Harbor, under the direction of C. B. Davenport, the effort towards the collection of data in regard to the inheritance of nervous and mental diseases has taken on a character of scientific and systematized investigation, which before was lacking. Through the work of this office and the impulse that it has given to other investigators, there have appeared in the last year or so a number of illuminating papers which have placed in a more tangible form the questions associated under the term inheritance, in individuals who are the subjects of nervous and mental disorders.

Two publications of the Record Office are worthy of notice and point the way which should be followed in the individual study of the various phases of the subject of inheritance. "The Trait Book," Bulletin No. 6, by C. B. Davenport, gives a list of traits which should form the

basis of the collection of data in individual instances. These are all numbered and divided under sub-heads and prepared for rapidity and ease of indexing. The classification is under seventeen heads, which include practically all the divisions which should be noticed in collecting data in the individual case.

In Bulletin No. 7, called the "Family-History Book," compiled by C. B. Davenport, are included a number of model histories in which the genealogical records of the family are set down. The authors of this book call attention to the fact that many genealogical records are faulty for the reason that they have only a legal significance, and that the male line alone is the one that is usually followed. In other words, it is the purpose apparently of the old genealogists to trail the name, and, when this disappears, the record ceases to be of interest. Under the newer notions underlying heredity, it is realized that the mother's blood contributes quite as much to the child as the father's—in fact, some traits are inherited by sons only from the mother's side of the house. A number of sample genealogies are found in this monograph. Of particular interest is the genealogy of the Beecher-Foote family, and of several criminals. The method of collecting, charting and analyzing data in the study of the collection of human heredity is carefully explained and illustrated, and accompanied by charts and keys to abbreviations, which, after a little study, make the matter sufficiently clear to enable one to read them easily.

In Bulletin No. 4 of the Record Office is published a first study of inheritance in epilepsy by Davenport and Weeks. Epilepsy is employed by them in a rather wide sense, including not only cases of well-marked convulsions, but also cases in which there has been only momentary loss of consciousness. Given epilepsy thus defined, the problem is to determine what laws, if any, are followed in its occurrence in successive generations, and how often does it arise *de novo* in a strain showing elsewhere no mental weakness; what is its relation to alcoholism, to paralysis, to migraine, and other symptoms of loss of neural strength. The answers to these questions can be reached only by a study of the pedigrees of families containing epilepsy, in which the psychic history of numerous members is precisely known. This study is based upon a number of pedigrees of the New Jersey State Village for epileptics at Skillman, N. J. The data were obtained by skilled field workers of the Eugenic Record Office, who were assigned to that Village. These women visited the homes of patients, interviewed the parents, other relatives and physician, for the purpose of securing accurate accounts of the mental history, environmental conditions, diseases and causes of death of as many relatives as possible of the patients. The number and separation of pedigrees which were used in the present study were one hundred and seventy-seven. The total number of epilepsies analyzed is two hundred and six. The data obtained in this way have been analyzed by the method commonly employed by biologists known as the Mendelian method. This method assumes that the inheritance of any character is not from the parents, grandparents, etc., but from a germ-plasm, out of which every fraternity and its parents and other relatives have arisen. The bodies of persons as we know them serve as imperfect indices to the nature of the germ-plasm from which they spring. The relation of soma and germ-plasm is as follows:—

1. If the soma lacks a unit character upon which normal development depends, that is *prima facie* evidence that the representative of that char-

acter is absent from its germ-plasm; consequently such a person cannot transmit the character in question.

2. If the soma has the unit character for normal development, that is evidence that the germ-plasm has the corresponding determiner. But either one of two cases is possible: (a) The determiner was derived from both sides of the house, so that it is double in the germ-plasm and all the germ cells have the character; or else (b) it came from one side of the house only, in which case it is single in the germ-plasm and half of the germ cells have and half lack the character. The condition in the case when the determiner is absent may be called the nulliplex.

The following conclusions are set down:—

1. The method of field-study of epileptic families combined with the modern biological methods of analysis of hereditary data constitutes a vastly improved means of inquiry into inheritance of epilepsy.

2. Epilepsy and feeble-mindedness show a great similarity of behavior in heredity, supporting the hypothesis that each is due to the absence of a protoplasmic factor that determines complete nervous development.

3. When both parents are either epileptic or feeble-minded all their offspring are so likewise.

4. The conditions named migraine, chorea, paralysis and extreme nervousness behave as though due to a simplex condition of the protoplasmic factor that conditions complete nervous development, *i. e.*, persons belonging to these classes usually carry some wholly defective germ cells. Such persons may be called 'tainted.'

5. When such a tainted individual is mated to a defective about one-half of the offspring are defective.

6. When a simplex normal is mated with a defective about half the offspring are normal; the others defective or neurotic.

7. When both parents are simplex in nervous development and 'tainted' about one-quarter (actually 30 per cent.) are defective.

8. The proportion of tainted offspring is not noticeably higher when both parents show the same nervous defect.

9. Normal parents that have epileptic offspring usually show gross nervous defect in their close relatives.

10. While we recognize that epilepsy is a complex, yet there is a classical type numerically so preponderant that, in the mass, epilepsy acts like a unit defect.

11. Our data point to a poisoning in slight degree of germ cells by alcohol, but the evidence is hardly crucial.

12. There is evidence that in epileptic strains the proportion of epileptic children in the latest complete generation is double that of the preceding; but there is no evidence that in these epileptic strains the average number of children in a fraternity is greater than in the population at large. Provided marriage matings continue as at present and no additional restraint is imposed, the proportion of epileptics in New Jersey would double every thirty years.

13. The most effective mode of preventing the increase of epileptics that society would probably countenance is the segregation during the reproductive period of all epileptics.

Bulletin No. 5 of the Eugenics Record Office contains a study of heredity of insanity in the light of the Mendelian theory by Rosanoff and Orr. This study was undertaken with the view of determining whether the so-called neuropathic constitution is transmitted in the man-

ner of a Mendelian trait. A brief statement of the Mendelian theory is given here and is worth including in this abstract on account of the clearness and simplicity of statement:—

The Mendelian theory assumes that the total inheritance of an individual is divisible into unit characters, each of which is, as a general rule, inherited independently of all other characters and may, therefore, be studied without reference to them. The inheritance of any such character is believed to be dependent upon the presence in the germ-plasm of a unit of substance called a determiner. With reference to any given character, the condition in an individual may be dominant or recessive. The character is dominant when, depending upon the presence of its determiner in the germ-plasm, it is plainly manifest; and it is recessive when, owing to the lack of its determiner in the germ-plasm, it is not present in the individual under consideration.

The dominant and recessive conditions of a character are designated by the symbols D. and R. respectively.

It is obvious that, as regards any character, an individual may inherit from both parents. This is called duplex inheritance and is designated by the symbol DD; or, from one parent only—simplex inheritance—designated by the symbol DR; or, he may fail to inherit from either parent—nulliplex inheritance, designated by the symbol RR. In the last case the individual will exhibit the recessive condition. It can be seen, therefore, that there are but six theoretically possible combinations of mates in a Mendelian inheritance system. It will be seen from this that attempting to predict the various types of offspring that can result from a given mating, it is essential to know not only whether the character is in each parent dominant or recessive, but in the case of the dominant condition, also, whether it is simplex or duplex. To put the whole matter in a nutshell, the essential difference between the dominant and the recessive conditions of a character lies in the fact that in a case of simplex inheritance the dominant condition is plainly manifest, while the recessive condition is not apparent and can be known to exist only through a study of ancestry and offspring.

The statistical basis of this study is based upon the pedigrees of 72 families, representing 206 different matings, with a total of 1097 offspring.

The following conclusions are set down as a result of this study:—

1. The neuropathic constitution is transmitted from generation to generation in the manner of a trait which is, in the Mendelian sense, recessive to the normal condition. Rules of theoretical expectation are accordingly as follow: (a) Both parents being neuropathic, all children will be neuropathic; (b) one parent being normal, but with the neuropathic taint from one grandparent, and the other parent being neuropathic, half the children will be neuropathic and half will be normal but capable of transmitting the neuropathic make-up to their progeny; (c) one parent being normal and of pure normal ancestry and the other parent being neuropathic, all the children will be normal but capable of transmitting the neuropathic make-up to their progeny; (d) both parents being normal, but each with the neuropathic taint from one grandparent, one-fourth of the children will be normal and not capable of transmitting the neuropathic make-up to their progeny, one-half will be normal but capable of transmitting the neuropathic make-up, and the remaining one-fourth will be neuropathic; (e) both parents being normal, one of pure normal ancestry and the other with the neuropathic taint from

one grandparent, all the children will be normal, half of them will be capable, and half not capable of transmitting the neuropathic make-up to their progeny; (f) both parents being normal and of pure normal ancestry, all the children will be normal and not capable of transmitting the neuropathic make-up to their progeny.

2. Various clinical neuropathic manifestations bear to one another the relationship of traits of various degrees of recessiveness; in a most marked way, recoverable psychoses, though recessive as compared with the normal condition, are dominant over epilepsy and allied disorders.

3. Various other clinical neuropathic manifestations bear to one another the relationship of neuropathic equivalents; that is to say, they are conditions of the same degree of recessiveness varying in their clinical manifestations with the personality of the subject, environmental conditions, etc.

4. All the neuropathic children which result from a mating of the fourth type (both parents normal, but each with the neuropathic taint from one grandparent) can have theoretically only equivalent defects and not defects of different degrees of recessiveness.

5. Among the actual results from such matings the following have been met with:—

(a) Brothers and sisters suffering from clinically identical neuropathic manifestations.

(b) Psychosis in one subject and peculiar or abnormal disposition, but no actual psychosis in brothers and sisters.

(c) Psychosis in one subject and isolated but clinically related symptoms in brothers or sisters; we find with particular frequency dementia præcox, fainting spells or convulsions in childhood.

(d) Psychoses clinically not known to be related: senile deterioration—peculiar hysteriform psychoses.

6. Neuropathic conditions show only in about one-fourth of the cases indications for commitment to sanitariums or public institutions. The total incidence of neuropathic conditions may be roughly estimated as affecting between 1.5 and 2 per cent. of the general population.

7. It is further estimated that about 30 per cent. of the general population, without being actually neuropathic, carry the neuropathic taint from their ancestors and are capable under certain conditions of transmitting the neuropathic make-up to their progeny.

Bulletin No. 3 of the Record Office is a preliminary report of a study of heredity in insanity in the light of the Mendelian laws by Gertrude L. Cannon and Rosanoff. They believe that the laws governing the transmission of traits by heredity, as established by Mendel, hold good not only for plants and the lower animals, but also for man, at least as regards certain characters, such as color of hair and color of eyes are concerned. If this is so then the question follows, naturally, Are there any of the forms of nervous and mental diseases transmitted from generation to generation, in accordance with these laws? The material upon which this study is based consists of the pedigrees of eleven patients at the hospital, including thirty-five different matings, with a total of two hundred and twenty-one offspring.

These conclusions are the result of this study:—

1. Both parents being neuropathic, all children will be neuropathic.

2. One parent being normal, but with the neuropathic taint from one parent, and the other parent being neuropathic, half the children will be neuropathic and half will be normal but capable of transmitting the neuropathic make-up to their progeny.

3. One parent being normal and of pure normal ancestry and the other parent being neuropathic, all children will be normal but capable of transmitting the neuropathic make-up to their progeny.

4. Both parents being normal, but each with the neuropathic taint from one parent, one-fourth of the children will be normal and not capable of transmitting the neuropathic make-up to their progeny, one-half will be normal but capable of transmitting the neuropathic make-up, and the remaining one-fourth will be neuropathic.

5. Both parents being normal, one of pure normal ancestry and the other with the neuropathic taint from one parent, all the children will be normal, half of them will be capable and half incapable of transmitting the neuropathic make-up to their progeny.

6. Both parents being normal and of pure normal ancestry, all children will be normal and not capable of transmitting the neuropathic make-up to their progeny.

A further contribution to the study of heredity in epilepsy is the work of Flood and Collins, the latter being a field-worker. This study comes out of the Monson State Hospital at Palmer, Mass., and is based upon the pedigrees of seventy-five patients. The pedigrees were examined with the view of obtaining light on the relation of alcoholism and in the parents to epilepsy in the children. Alcoholism is considered present in parents when they are believed to use alcohol in excess. Epilepsy is considered present when there is good indication that it may be in the germ-plasm; that is, if it occurs in the parents, in their fraternities, in first cousins, or in direct line of descent. The analysis of this carefully worked out material sums up as follows:—

1. We have no conclusive evidence that alcoholism in the parents is a cause of epilepsy in the children, although alcoholism is often associated with epilepsy. It may be regarded as a concomitant of epilepsy and an additional evidence of nervous weakness.

2. Feeble-mindedness is also associated with epilepsy and there is some evidence that it is caused by the same defect that caused the epilepsy.

3. Fitting the material to the two hypotheses, first that epilepsy is a recessive trait that is inherited only as epilepsy, and secondly, that epilepsy, feeble-mindedness and insanity are due to the same defect which may appear in the form of any one of them, there is no striking evidence in favor of one to the exclusion of the other. The truth probably lies somewhere between the two.

4. While we are not in a position to say at present whether every case of epilepsy is inherited, or to say in what proportion of cases it is inherited, we can say that in a large proportion of cases there is some nervous defect on both sides of the family. These defects may be epilepsy, feeble-mindedness, insanity, extreme nervousness, migraine, alcoholism, sexual immorality and lack of moral sense.

As a conclusion of this study the authors express the opinion that the ultimate purpose of the study of the inheritance of epilepsy is to learn what are the expectations in regard to the condition of offspring in epileptic families. The prevention of the birth of epileptics is a far more feasible scheme in our present state of knowledge than the cure of those already infected. With the scientific knowledge of what may be definitely predicted if epileptics, or persons of epileptic strain marry and have children, we would be in a position to begin legislation and the popular education on the subject.

Cotton, in a paper entitled "Some Problems in the Study of Heredity in Mental Diseases," gives a very concise analysis of the work that has been so far done according to the rules laid down by well-recognized eugenic procedures. He calls attention to the important part prophylaxis plays as a factor in the heredity of mental diseases.

The problem, as far as psychiatry is concerned, is much more complex, for in a great many types the external factors play a much more important rôle in the production of psychoses than the hereditary features. Especially is this true of the types which are due to the direct effect of toxins and poisons. Such is the case, for instance, in general paralysis, where we know to a certainty that the disease is not dependent upon heredity. Delirious conditions, exhaustion psychoses and, to some extent, manic-depressive insanity might be produced by external factors which largely outweigh any effect of defective inheritance.

Among the problems met with by psychiatrists will be: (a) Study of direct inheritance of certain types; (b) the effects upon the succeeding generations of the neuropathic constitution as expressed by eccentricities, peculiarities, alcoholism, etc., in the parents; (c) to what extent these factors are responsible for the occurrence of various types of psychoses in the progeny; (d) the effect of the occurrence of certain types of psychoses in the ancestors upon the production either of similar or dissimilar types in the progeny.

Cotton makes no attempt to give any conclusions regarding hereditary factors in the various psychoses. Its value as a paper lies in the fact that he gives a résumé of the important work that has so far been done, and outlines the methods to be pursued to obtain the best results in future work. A splendid bibliography is included in his paper.

One of the most valuable contributions on the subject is from the pen of Mott, under the title "Inborn Factors of Nervous and Mental Diseases," in which he discusses the questions of inheritance in general, and in particular, hereditary features of insanity. He calls attention to the importance of environment and experience and the conditions due to them, and their important bearing on inheritance. Also that a neurotic temperament may be manifested in many different ways, like conduct and behavior, and this neurotic temperament may be the first evidence of any degeneration in the stock. Unsound stock may have successful men in the eyes of the world, but these may really form the first step in the process of degeneration, for avarice and normal guile, which made them pillars of society, may come out in the next generation as gross criminality, or insanity. Mott is of the opinion that inborn factors partly, if not wholly, can account for the appearance of insanity in the stock.

In this article of Mott he discusses the law of anticipation, which was defined by Nettleship as a manifestation of the morbid change at an earlier period of life either in members of such succeeding generation as a whole, or successively born children of one parentage. His observation that there is a general tendency for insanity not to proceed beyond three generations, either because of regression to the normal, or from the fact that the stock dies out, is important. His explanation is, that not infrequently the stock dies out through the inborn tendency of insanity to manifest itself in the form of congenital types, such as imbecility, or in the insanity of adolescence.

Dr. Edward Shuster's conclusions on the study of inheritance of the same types of insanity are given as follow:—

1. A periodically insane son or daughter is more likely to be asso-

ciated with a periodically insane mother or father than if one is differently affected. In the case of two offspring in the insane there is even a greater tendency for a periodically insane male or female to be associated with a periodically insane brother or sister than with one differently affected.

2. In case of delusional insanity, the tendency for the affection to run in families is very strongly marked, and the correlation between members of the same co-fraternity is more strongly marked than between parents and offspring.

3. In the instance of primary dementia of adolescence, there is a strong correlation between members of the same co-fraternity. There is also a decided tendency indicated for the brothers and sisters of imbeciles to be also imbeciles.

4. There is no indication of general paralysis running in families. This is not surprising, as it is now recognized to be an acquired disease due to syphilitic infection. Both conclusions would seem to be justified from our knowledge at the present time. The chief criticism of Mott's work is that he has not gone carefully enough into the question, as he has practically taken only the cases which have been admitted to the institutions as a basis for his statistics, thus leaving out of consideration a large number of important individuals.

In the presidential address of Savage, delivered at the opening meeting of the section of psychiatry of the Royal Society of Medicine, he touches upon some of the phases of heredity in an interesting way. He says: "We have got so far as to disregard the older faith that there was a distinct evidence of passing-on of disease as such. We are now content to say that a tendency is present, armed if the soil is provided and with other environmental conditions to the true exciting causes of disease. The special, or, I might say, the specific tendency to develop particularly disordered states varies so that those prone to neuroses are not necessarily more liable to febrile and other diseases. Though I have been very much struck with the tendencies of members of certain neurotic families to contract any febrile disease which may be present, I do not believe in the transmission of any definite form of mental disorder, but I have met with instances in which both the parent and child have had similar delusions, such, for instance, as that they have committed the unpardonable sin. We accept the inheritance of bodily likeness and of the material bases of thought and feeling, likeness in the senses and their reaction to surroundings, and it is therefore not surprising to find the tendency of inheritance to certain disorders of mind in which sensory troubles are most marked and potent in producing the morbid conduct. It is almost universal in my experience to find the sufferer in organized delusional insanity to belong to insane and highly unstable, nervous stock. I have been interested to find out the recent statistics show that, at least, one-third of all the patients admitted into the asylums have insane blood relations.

"In considering heredity, too much stress must not be laid on the existence of some forms of mental disorders in the family—insanity, like genius, may be an accident. It is certain that some families in which every form of neurosis has been represented have succeeded in the breeding out of the tendency."

HYPOPHYSEAL EXTRACT IN OBSTETRICS AND GYNECOLOGY.

A REVIEW OF RECENT LITERATURE.

By RANDALL S. TILLES, M. D., of St. Louis.

1. Rathke (*Journ. Amer. Med. Assoc.*, Vol. LVIII, p. 294).
2. Cushing (*Amer. Journ. Med. Sciences*, p. 473, April, 1910).
3. Handelsmann and Horsley (*British Med. Journ.*, November, 1911).
4. Miller (*Archives Int. Med.*, June, 1911).
5. Wiggers (*Amer. Journ. Med. Sciences*, April, 1911).
6. Ott (*Amer. Journ. Obstet.*, Vol. 66, p. 519).
7. Parisot and Spire (*Journ. de Méd.*, May 11th, 1912).
8. Klotz (*Muench. med. Wochenschr.*, May 23rd, 1911).
9. Jaschke (*Muench. med. Wochenschr.*, July 25th, 1912).
10. Hofbauer (*Muench. med. Wochenschr.*, May 28th, 1912).
11. Patek (*Zentralbl. fuer Gynæk.*, p. 1083, 1912).
12. Herff (*Muench. med. Wochenschr.*, January 16th, 1912).
13. McCord (*Archives Int. Med.*, November, 1911).
14. Benthin (*Zeitschr. fuer Gynæk. und Geburts.*, Bd. LXXII).
15. Keher (*Amer. Journ. Obstet.*, Vol. 66, p. 516).
16. Hirsch (*Muench. med. Wochenschr.*, April 30th, 1912).
17. Fischer (*Zentralbl. fuer Gynæk.*, January 6th, 1912).
18. Stern (*Berl. klin. Wochenschr.*, No. 32, 1911).
19. Hager (*Zentralbl. fuer Gynæk.*, p. 304, 1912).
20. Hahl (*Finska. Lakaresallsk Handl.*, Vol. LIII, 1911).
21. Parisot (*Ann. de Gynéc. et d'Obst.*, December, 1911).
22. Vogt (*Muench. med. Wochenschr.*, December 19th, 1911).
23. Brammer (*Hospitalstidende*, Vol. LV, No. 14).
24. Rieck (*Muench. med. Wochenschr.*, April, 1912).
25. Schmidt (*Gynæk. Rund.*, No. 15, 1911).
26. Hamm (*Muench. med. Wochenschr.*, January 9th, 1912).
27. Jaeger (*Muench. med. Wochenschr.*, February 6th, 1912).
28. Kromer (*Zentralbl. fuer Gynæk.*, September 30th, 1911).
29. Fries (*Muench. med. Wochenschr.*, November 14th, 1911).
30. Eisenbach (*Muench. med. Wochenschr.*, November 5th, 1912).
31. Stiassny (*Gynæk. Rund.*, No. 13, 1911).
32. Gussew (*Zentralbl. fuer Gynæk.*, p. 1755, 1912).
33. Gruenbaum (*Muench. med. Wochenschr.*, p. 2048, September, 1912).
34. Aubert (*Zentralbl. fuer Gynæk.*, p. 1447, 1912).
35. Liepman (*Thérapeut. Monatshefte*, p. 1447, August, 1912).
36. Nagy (*Zentralbl. fuer Gynæk.*, p. 300, 1912).
37. Malinowsky (*Zentralbl. fuer Gynæk.*, p. 1425, 1912).
38. Hare (*Amer. Journ. Obstet.*, Vol. 66, p. 516).
39. Krakauer (*Berl. klin. Wochenschr.*, December 3rd, 1912).

40. Trapl (*Monatsschr. fuer Gynæk.*, p. 393, October, 1912).
41. Bidwell (*Clinical Journ.*, London, September 6th, 1911).
42. Menge (*Zentralbl. fuer Gynæk.*, September 2nd, 1911).
43. Klotz (*Muench. med. Wochenschr.*, Vol. LIX, No. 21).

In writing this review of the literature of the action of the hypophyseal extract in obstetrics and gynecology, no attempt will be made to discuss such diseases or conditions as result from either a hyper- or hypo-secretion of the anterior or posterior lobes of the hypophysis, but merely the latest results and opinions that could be gathered from the literature of the last two years.

The pituitary body, according to Rathke, is a composite gland, with a double source of origin. It is made up of a smaller posterior lobe with a nucleus of neural origin—the pars nervosa, which becomes invested by, and intimately fused with a portion of the epithelial sac—the pars intermedia, that has arisen from a diverticulum of the buccal epithelium, and of a larger purely epithelial lobe—the pars anterior, arising from the same source as the pars intermedia, but from which it remains more or less separated by a cleft. The pituitary body is a double organ in the sense that the secretion of its anterior and solidly epithelial portion discharges into the blood sinuses which traverse this part of the gland; whereas the hyaline substance, apparently the product of secretion from the epithelial investment of the posterior lobe, enters the cerebrospinal space by way of canals in the pars nervosa. The secretion of the posterior lobe does not seem to be so vitally essential to physiological equilibrium as that of the anterior lobe, the total removal of which, as observed by Cushing, leads to death with a peculiar train of symptoms that set in at an early date in the adult, and later in younger animals. Experiments upon 54 animals by Handelsmann and Horsley, made by removal or cauterization of the pituitary body, including the pars anterior, pars posterior and pars intermedia, showed that the animal did not die quickly with symptoms of cachexia; hence they concluded that the question of vital importance of the gland will still require very careful investigation. Miller, of Chicago, after feeding 23 rats with weighed amounts of the dried hypophysis mixed with cracker, over a period varying from sixty-eight to ninety days, found his results were completely negative, both as regards weight and skeletal changes as shown by the x-ray.

As regards the chief physiological effects observed by administering the extracts of both lobes, it is generally conceded that the peripheral vessels are constricted, probably by a direct muscular action, thus producing a marked rise in arterial pressure. This, Howell has proved to be confined to the extract of the posterior lobe. Wiggers, in April, 1911, showed that the constriction is not equally produced in all organs, as the renal vessels were at least passively dilated during its action, which no doubt accounts for its diuretic effect observed by him, as well as by Cushing. Wiggers further concludes that the extracts slow and strengthen the heart, although myographic tracings indicate a depressing influence to be the most constant and characteristic one upon that organ. The same conclusions were reached by Ott and others. Ott adds that, by injecting the pituitary extract into a vein of a goat's ear during the early nursing period, the secretion of milk was greatly increased; the flow starting in one minute and reaching its height in four minutes, then gradually returning to normal. He considers it a most powerful galactagogue.

Parisot and Spire claim further that the action of the extract, especially that of the posterior lobe, which is more powerful than that of the anterior lobe, has an action on the contraction of unstriated muscular fibres, including the unstriated fibres of blood-vessels, which raises the arterial pressure. It also causes the natural urination of women in labor, by causing contractions of the muscles of the bladder. Klotz, in Sellheim's clinic in Tuebingen, states that the moderate rise produced in blood-pressure lasts for several hours, with only slight demands on the heart; he mentions also the stimulating effect on peristalsis and the increased contractions of the bladder and the uterus.

While it is generally agreed upon that the extract of the posterior lobe produces a marked rise in blood-pressure, Miller has proved that the extract of the anterior lobe gives a primary fall, followed by a secondary rise in pressure. He also found a depressor substance, soluble in alcohol, in the *pars intermedia* and the *pars nervosa*, as well as in the anterior lobe.

Pituitary extract resembles adrenalin in its action, in that it causes a rise in blood-pressure, acting as a cardiovascular tonic. Jaschke claims that its action in overcoming shock is more prolonged than that of adrenalin.

Each preparation of the hypophyseal extract will be named in this review, according to the special extract used, whether it be the Pituitrin of Parke, Davis and Company, the Extract of Pituitary Gland of Burroughs, Wellcome, or the Pituglandol of Hoffman-LaRoche of Basle, Switzerland. Occasional failures and differences in effect may be explained by the fact that the nature and production of the extract itself may preclude the possibility of equal or constant physiological effects. Most authors are of the common opinion that the three preparations are about equal in their action. Hofbauer, to whom belongs the credit of first using the hypophyseal extract as an oxytocic, claims, in a report of his results in a series of 800 cases, that the three preparations show approximately the same pharmacological effect, but he prefers especially the Parke, Davis preparation. Interesting observations, upon the pronounced and rapid contraction of the cervical portion of the uterus, was noted by Patek in 3 cases after the use of Pituglandol; he suggests the possibility that substances extracted from the anterior lobe of the hypophysis may have this specific tetanic effect. In communicating with Hoffman-LaRoche, the manufacturers, they acknowledge the difficulty in separating the anterior and posterior portions of the gland, which may occasionally cause an admixture of the extract of the anterior lobe. Herff saw in one case a slight tetanic condition and in another very persistent vomiting after the use of Pituitrin. Hofbauer has called attention to the fact that traces of alcohol, remaining in hypodermic syringes after disinfection, may completely destroy the effect of the hypophyseal extract. This observation, however, has not been borne out by other investigators. He contends that preparations of the extract deteriorate when exposed to air, while Cushing has demonstrated that extracts of the gland, even when boiled, retain undiminished their evidences of physiological activity, thus making possible the production of sterile extracts.

The hypodermic use of the drug has been generally adopted, causes no pain, and has no apparent variation in action due to the site of injection. Klotz feels that by intramuscular injection the action is more speedy, and he does not fear any bad results. Hofbauer has used intravenous injections only in cases where a most intense effect is desired,

and then only in doses of $\frac{1}{3}$ to $\frac{1}{2}$ c.cm.; the usually accepted hypodermic dose being 1 c.cm. The physiological effects, as gathered from the greatest number of reports, are manifest in from three to seven minutes. Hofbauer, who fixes his optimal dose at one gram, states, that if there is no marked effect after ten minutes, a second dose can be given. In animals, the uterus proves refractory to repeated injections, but in the human the second dose always proves effective. He has observed neither tetanic nor toxic symptoms where he used as much as 7 c.cm. in twenty-four hours, although McCord experimentally proved that a depressor action was elicited by repeated injections. Under the average dosage the duration of effect varies individually, but probably averages from three-quarters of an hour to one hour.

Coming now to a consideration of the direct effect of the pituitary extract upon the uterus, it is plainly manifest that by far the greatest number of clinical reports come from the continent of Europe. These reports concern its effect upon this organ, before, during, or after pregnancy, including many complications of labor, as well as its associations and combinations with other drugs. Pituitary extract, as used in producing abortion, premature labor, and the induction of labor, has had its many clinical experimenters; however, it has not always been found effective. It is now generally conceded that the effect of the extract on the uterine contractions is more pronounced the longer the labor has lasted, having but little value for the purpose of starting labor, but being of great importance as an adjuvant of other mechanical means. Benthin goes so far as to report 40 cases where he used the extract to differentiate between the false and true pains of labor. He states that if given during labor, a prompt oxytocic action results, but if pregnancy has not reached term the extract has but a transient action, and additional doses have no effect whatsoever. He adds that if the pains are induced after the administration of the drug, they are gradually diminished, even when the extract has been continued. On the other hand, in the presence of weak or diminished *true* labor pains, even small doses are sufficient to stimulate the uterus to continuous contractions. As an ecboic agent, Kehrer finds the extract most reliable. When it is desired to empty the uterus before pregnancy has been completed, he produces an artificial dilatation of the os, and then gives Pituitrin hypodermically, since, in instances in which it is given without the preliminary dilatation, no effect is produced. In other words it aids in the induction of abortion, but does not lend itself to the task of being solely responsible. Agreeing with the above authors, a conclusion of Hirsch may be supplemented—namely, it is impossible to induce abortion or premature labor by means of the hypophyseal extract, but it is of value in cases where labor has been started artificially, by meturynter or cervical tamponade. Fischer found the extract ineffective in producing labor prematurely or at the end of term, but of excellent service in active abortion or active premature labor. Contrary to the views of Fischer concerning its effect at the end of labor, we have the report of Stern who succeeded in actually starting labor in 2 cases, complicated by laryngeal tuberculosis and nephritis respectively. The following case report of Hager also accomplishes the same result: This patient overcarried in the first pregnancy thirty-four days over the expected term. An 11 lb. child was born dead. In the next pregnancy the date of labor was calculated to be due November 1st; when this date had passed the patient became extremely nervous. On the 15th, a small dose of Pituitrin was injected; no effect was observed. Seven hours later another small dose was given; this was fol-

lowed immediately by severe contractions with the rupture of the membranes. One and a half hours later a full-term child was born.

Uterine contractions, during active labor, are influenced greatly by the period of injection, whether in the stage of dilatation, expulsion, or beginning of labor, the most prompt effects being observed the nearer it is administered to the time of rupture of the membranes. The greatest effect is seen during the period of expulsion, the contractions then being rendered stronger and more frequent and the pauses between the pains shorter. Suffering does not seem to be increased. Hofbauer claims that the contractions imitate the normal rhythmus, that the interval is shortened and the contraction itself more intense and lengthened. Hahl, of Berlin, reports 34 cases, in 4 of which the character of the pains and intervals were studied with the apparatus of Westermarck. In the 4 cases studied instrumentally, the duration of the pains, the intervals, and the corresponding intra-uterine pressure in mm. of mercury were noted. He observed that in 2 cases the pains became more regular and powerful and remained of constant strength for ninety-six minutes and then weakened. In the remaining 2, the pains became shorter but stronger, the intervals of less duration and the intra-uterine pressure higher. The pains in these cases became more tetanic, although the dose of Pituitrin was not over 0.7 grm. The remaining 30 cases he listed as follows: 22 favorable effect; 6 distinct, but not marked; 2 no results observed.

Benthin calls attention to the fact that the reflex abdominal contractions, during the expulsive stage of labor, are also favorably influenced by the drug. Hoffbauer, in the article previously mentioned, states that in some instances where the effect is not particularly manifest, the uterus nevertheless seems to be in a state of increased sensibility and responds more quickly to extraneous influences—for instance, to heat and to drugs. He used, in such instances, quinine with marked results. Along the same line of observation, Fischer, in speaking of post-partum hemorrhage, advises that the injection be given before the completion of labor, thereby increasing the irritability of the uterine muscle to such an extent, that, if hemorrhage occurs, it can then be more easily controlled by the usual procedures. Parisot, in 4 cases, hoping to arouse the uterus to better contractions, observed no apparent effect in 1 case, and, in the other 3, tardy contractions; while Vogt, to prevent weakening of the uterine contractions seen in contracted pelvis, advocates this drug as most useful in these cases. It is best given when the head has entered the pelvis and is in the stage of moulding.

Reports from the Russian clinics of Ginenwicz, of St. Petersburg, of Gressen, of Moscow, and of Kakuschire, of St. Petersburg, are all most favorable.

As some adverse opinions, even of the most accepted subjects, are forever forthcoming, it behooves us to mention here that Brammer, of Copenhagen, in 12 cases, claims that the action of the extract is irregular and may induce such violent contractions as even to endanger the fetus; that nausea and vomiting were observed in one case five hours after injection, and, in another, contractions became so violent that chloroform was administered; for these and other reasons, he confirms the necessity of remaining with the patient for at least one hour after administration of this drug. He further adds that contraindications of the drug are an abnormally high blood-pressure from arteriosclerosis or nephritis and a tendency to nervousness or hysteria, as these may magnify the influence of the uterus and lead to too violent contractions.

It is also mentioned elsewhere, that the contractions may come in such

close succession that there is practically no rest between them, while in other cases the duration of the contractions seems unduly lengthened, in some instances lasting up to seventeen minutes. Illustrative of this, is the case report of Rieck which follows:—

"Premature birth is a secundipara with premature rupture of the membranes, cervical canal open for two fingers; 0.75 grm. Parke, Davis Pituitrin injected. Uterus goes into tetanic contraction after a cessation of further dilatation of the cervix, for several hours. Was forced to do a version which was extremely difficult, due to the tetanic contractions of the uterus."

Having used a comparatively small dose, Rieck feels that in some cases the effect of pituitrin is no better than ergot. Hofbauer, to whom we must accede the greatest experiences with the hypophyseal extract, says the first contractions only, following the primary injection, may last several minutes.

Although there may be objections to the use of pituitrin in its action in stimulating normal labor pains, it has an almost undisputed field in the realm of inertia uteri, both primary and secondary. Schmidt remarks it is the only infallible means of producing contractions in inertia uteri, rapid labor and little hemorrhage being the result of its administration. Hamm, in reporting 50 cases in which all three preparations of the extract were used, shows uniformly most satisfactory results. In 39 cases of those reported, 27 were instances of primary, and 12 of secondary inertia. In one case, particularly of clonic contractions where the extract was used in conjunction with pantopon-scopolamine, strong rhythmic contractions appeared from within two to five minutes after injection; in the other cases, the children were expelled from within ten minutes to two hours. Most obvious was the effect in the second stage of labor. In one other case, primigravida, the os opened a little more than one finger; spontaneous birth occurred thirty minutes after injection.

Jaeger, who used the Pituitary Extract Ex-Infundibular of Burroughs. Wellcome in thirty cases, called attention to the fact, that it is especially indicated in cases of secondary inertia when the pains are weak on account of slight degrees of pelvic contraction or over-distension, as in hydramnios or twins. Fischer, however, includes narrow pelves, rise of temperature during labor, danger of infection after intra-uterine manipulations, and certain cases of placenta previa. Fever of the parturient does not interfere with the effect of pituitrin.

Kromer reports 2 adverse cases, one a case of inertia uteri, in which pituitrin was injected into the muscles without marked effect in increasing contractions; in the second case, it caused contractions but not sufficient for delivery, and cesarean section became necessary. The operation was almost bloodless and contraction of the uterus occurred immediately after delivery.

As regards the value of pituitary extract in the treatment of severe atonic conditions, opinions vary. Ergot preparations seem accepted by many clinicians as the more valuable. Schmidt makes the statement, that pituitrin is the best of all the drugs in the treatment of post-partum hemorrhage and is superior to ergot, in that it may be administered before the separation of the placenta. Hirsch recommends pituitrin for cesarean section before operation to prevent post-partum hemorrhage, but adds, should hemorrhage occur, secacornin is preferable. Fries relies on pituitrin in post-partum hemorrhage and in the delivery of the placenta, while Patek, in an article "On the Unusual Effect of Pituitary Extract on the Parturient Uterus," claims never to have had any atonic

hemorrhage, and only in a few instances was it necessary to remove remaining parts of the placenta. On the other hand, Jaeger observed that a hemorrhage may be expected, if the child is born approximately one hour after the injection, and advises, in these cases, that the third stage of labor must be watched carefully. He concludes that in the treatment of atonic hemorrhage, post-partum, other drugs are equal to, if not superior to, the hypophyseal extract. In an article by Eisenbach, of Tuebingen, it seems noteworthy that in marked contradistinction to the general trend of opinion, this author recommends the use of Pituglandol, especially in atonic hemorrhage. Herff claims that in very serious atonics, post-partum, best results are obtained by combining Pituglandol and secacornin; while Hofbauer, in discussing the article of Herff, feels that the opinion, most generally held, should be that hypophyseal extract is oxytocic and that secacornin is best for all atonic hemorrhages.

Pituitrin, in combination with such drugs as morphine, pantopon-scopolamine and the general anesthetics, used for the relief of the pain accompanying the normal uterine contractions, finds a new indication for itself as pointed out by Stiasny. Heretofore, it has been a distressing fact that most of these methods interfere with the progress of labor. It has always seemed desirable to counteract this untoward effect by the use of an oxytocic. Stiasny finds that the sought for remedy is found in pituitrin, which apparently acts as an effective antidote against that component of pantopon and other drugs which retards labor.

Hengge makes use of the suggestion of Stiasny by producing a semi-comatose condition, known as the *Dämmer-schlaf*, and reports favorable results with the hypophyseal extract.

Schmidt, writing of pantopon, says it is a most valuable narcotic and free from danger. In large doses, however, it interferes with the progress of labor, but by combining it with Pituitrin, the pain of normal labor is markedly reduced and, on the other hand, the labor-interfering influence of the narcotic is counteracted. Gussew states that, with morphine and chloroform, his effects of Pituitrin have been impaired; but Hofbauer, in a much larger number of case reports, states that it is of great practical importance, and that narcotics (morphine and pantopon) or general anesthetics (chloroform and ether) do not interfere with the Pituitrin effect.

In conservative obstetrics, Pituitrin becomes of great value, in that it often avoids the necessity of surgical interference. While probably this is of little consequence in a well-managed hospital, any interference in the home of the patient harbors the danger of infection. This idea is emphasized by Gruenbaum, who says that Pituitrin often obviates the use of applying forceps. Rieck also maintains the advantage of Pituitrin in the private home, where he used it most satisfactorily in a case of placenta previa lateralis, after artificial rupture of the membranes; thereby obviating the use of either meturynter or cervical tamponade.

In cases of slight degrees of pelvic contraction, as well as breech and face presentations, Pituitrin, by the increased expulsive powers, has been of assistance in causing engagement of the head, often obviating use of forceps. Vogt claims that since this drug has been used in cases of contracted pelves, no forceps operation has been necessary, although contracted pelves are common in Dresden. Jæger, in recording his results with the Burroughs, Wellcome preparation, says, that in many instances, the extract will obviate forceps extraction. Aubert finds the best proof of the efficiency of Pituitrin in the fact that, in the maternity hospital

of Geneva, the percentage of forceps operations in one year has fallen from 5 per cent. to 2.26 per cent. Liepman is a most enthusiastic advocate of hypophyseal extract, and condenses his views into the following terse rules:—

No forceps without trial with the hypophyseal extract,

No cesarean section without this drug.

No birth anomaly, which is likely to cause an atony, without the prophylactic administration of this extract.

Nagy, writing on labor pains and Pituitrin, says that the effect of Pituitrin on the fetal heart is normally very pronounced; that the reduction of the fetal pulse-rate is often alarming; therefore, in his opinion, the drug should not be used when the fetal heart-sounds become bad, but forceps should be applied. Gruenbaum, on the other hand, claims that it may actually save the life of a child, whose heart action has been noticed to be impaired due to the head being compressed in the pelvis. As to the resultant bradycardia, which is rather constantly observed, Malinowsky has seen, during tetanic conditions of the uterus, that the fetal heart-sounds would sink to 50 or 60 beats a minute, quickly returning to normal, the children being born without any signs of asphyxiation.

Hare, in a recent article, claims that the child may be influenced by an increase in the strength of the fetal cardiac contractions, but it has not yet been decided whether this is due to the direct effect of the drug or to changes in the uterine circulation. Hofbauer concludes that the general consensus of opinion is that it does not harm the children in spite of the fact that in many instances a pronounced fetal bradycardia has been observed.

As regards pituitary extract and cesarean section, alluded to in the preceding pages, the general trend of opinion points to its favorable use as a prophylactic in this condition. Stern reports 7 cases of extra-peritoneal cesarean section, where it effectively shortened the third stage of labor, while Kromer, who used it in a case finally brought to cesarean section, says the operation was almost bloodless and contractions occurred immediately after delivery.

In eclampsia, either imminent or existing, it can be used for purposes of hastening expulsion. Krakauer reports a case where an injection of Pituglandol led to the complete dilatation of the cervix, and the expulsion of the placenta within two hours, during which time the patient was kept lightly under chloroform anesthesia. Brammer, of Copenhagen, warns against its use with a tense pulse and any signs of impending eclampsia.

In 16 cases of placenta previa, we have the extremely satisfactory report of Trapl. In all, the results were good for the mother; only in 1 case a severe atonic hemorrhage resulted in the third stage; 13 of the children were born alive. He describes his method as follows:—

(a) If only a small portion of the placenta lies within the opening of the cervix, head or breech presenting, cervical canal at least somewhat shortened or opened, the membranes are ruptured artificially, and Pituitrin or Pituglandol is then immediately injected.

(b) If a large portion of the placenta presents, version is performed, a foot pulled down and the hypophyseal extract injected. No attempts are made to extract the fetus.

(c) If the cervical canal is closed, or almost so, the vagina either is packed or a small meturynter is introduced; when the os is dilated sufficiently, one of the methods mentioned above is followed.

Hamm warns against the use of Pituitrin before the cervical canal is

obliterated, because there does exist, in his opinion, a certain danger of a tight contraction of the vaginal portion of the cervix in such instances. Hofbauer, who has not observed such spasm, says that he cannot agree with Hamm, who fears the contraction of the cervix especially in placental previa. Vogt observed a premature detachment of the placenta in one of his cases, yet Hofbauer does not feel ready to deny the causal relation between this unfortunate issue and the use of the drug, but suggests that it could possibly be only a coincidence.

The value of employing pituitrin after operations, for the purpose of stimulating peristalsis and the bladder functions, has been mentioned by several authors. Jaschke was among the first to bring a record of apparently satisfactory results in a series of 44 cases, including a variety of plastic and other gynecological operations, with a special reference to the bladder function. Among them were 4 cases of cesarean section operated upon by the method of Opitz, necessitating extensive separation of the bladder from the uterus. In 21 of the reported cases, the bladder was spontaneously emptied on the day of the operation; in 14 cases, urination occurred on the second day. Fischer reports only good results. His conclusions are identical with those usually found in other favorable reports. In 2 cases of retention of urine, post-partum, both voided spontaneously three-fourths of an hour and one and one-half hours, respectively, after injection.

Bidwell, in order to discover how far the pituitary extract, unaided by aperients, was able to restore peristaltic contractions after abdominal operations, tried its effect in 21 unselected laparotomies. He observed that pituitary extract had a very marked effect upon the bowel musculature, and was able to overcome the temporary paralysis due to exposure. This was shown by the early passage of flatus and the absence of abdominal discomfort. In most cases, the first bowel movement was induced by a simple enema, but no aperients were given by mouth.

The claim first made by Hofbauer, that the hypophyseal extract shows good effects in cases of puerperal ischuria, has not been confirmed by all writers. Obviously, the failures are due, no doubt, to the variety of causes of this condition. He also observed good results with Pituitrin in 2 cases of pregnancy dermatoses. Aarons advocates the extract in cases of hemorrhage, intestinal paresis, and shock.

Both Brammer and Herff report 1 case each, in which nausea and vomiting followed the use of Pituglandol. Menge, in a case of osteomalacia in a twelfth pregnancy, where the patient was unable to go upstairs or turn herself in bed, reports that after the third injection of Pituitrin, the patient, of her own accord, said that she felt better, and a few days later she was able to walk upstairs, all the clinical symptoms being relieved.

Klotz suggests, after his experiences with rachitis, and also osteomalacia, that the true cause of both is some disturbance in the phosphorous rather than the calcium metabolism. He found that the coloring matter of the hypophysis is particularly rich in phosphorus.

In conclusion, the writer wishes to assert that, even though his personal experiences with the hypophyseal extract have been very small in comparison to those of others which have been mentioned here, they have always been favorable both in the field of obstetrics and in post-operative conditions. He has, however, throughout the article tried to be wholly impartial, and feels that the observations and opinions set forth have been presented without bias, either for or against the drug.

THE X-RAY ESTIMATION OF ANATOMIC AGE.

A REVIEW OF RECENT LITERATURE.

By E. H. SKINNER, M. D., of the Editorial Staff.

1. Long and Caldwell: Some Investigations Concerning the Relation Between Carpal Ossification and Physical and Mental Development. (*Amer. Journ. Dis. Children*, Vol. 1, pp. 113-138, February, 1911.)
2. Roger: The Opacity of Bones to Roentgen Rays as an Indication of Age. (*Scientific American*, Vol. 99, p. 95, August 8th, 1908.)
3. Pryor: The Chronology and Order of Ossification of the Bones of the Human Carpus. X-Ray Method. (*Bulletin State University, Lexington, Ky.*, New Series I, No. 2, April, 1908.)
4. Pryor: Development of the Bones of the Hand as Shown by the X-Ray Method. (*Bulletin State College of Kentucky*, Series 2, No. 5, June, 1905.)
5. Pryor: Ossification of the Epiphyses of the Hand. X-Ray Method. (*Bulletin State College of Kentucky*, Series 3, No. 4, October, 1906.)
6. Rotch: The Position and Work of the American Pediatric Society Toward Public Questions. (*Archives Pediatrics*, Vol. 26, No. 10, October, 1909.)
7. Rotch: The Conditions Pertaining to the Safe-Guarding of the Early Life from a Pediatric Point of View. (*New York Med. Journ.*, Vol. II, No. 2, June 18th, 1910.)
8. Rotch: The Roentgen Ray in Pediatrics, pp. 49-68. J. B. Lippincott Company. 1910.
9. Rotch: School Life and Its Relation to Child's Development. (*Amer. Journ. Med. Sciences*, Vol. CXXXVIII, p. 702.)
10. Rotch: The Development of the Bones in Early Life, Studied by the Roentgen Method for the Determination of an Anatomic Index. (*Trans. Assoc. Amer. Phys.*, Vol. XXIV, pp. 603-624, 1909.)
11. Smith: Rotch Method of Roentgenographic Age Determination. (*U. S. Naval Medical Bulletin*, Vol. 7, No. 1, pp. 1-20, January, 1913.)

The increasing interest in the social and physical welfare of the child has revealed the fact that the chronological estimation of physical and mental capacity is unsatisfactory. Some years ago Crampton brought forth his studies of physiologic age estimation, which are more or less complex, lacking mechanical foundation. Rotch approached the subject from an anatomical standpoint and has shown the feasibility of estimating anatomic age by means of radiographs. Pryor, an anatomist, had previously studied the development of the epiphyses in the hands

and wrists of children, only to find that former textbook ideas of the age incident to epiphyseal development were more or less erroneous. Rotch is responsible for the prominence of the phrase 'anatomic age' and his hypothetical application of the method has been elaborated to a degree approaching unreasonable imagination. A practical attempt by Smith, to apply the Rotch method at the Annapolis Naval Academy, as an anatomic index in correlating mental and physical efficiency, or the contrary, failed in establishing satisfactory results, although the experiments developed some interesting features, which will be described in a succeeding paragraph.

Long and Caldwell criticize the reliability of Rotch's work rather severely, as they found no relation between the degree of carpal development and the quality of mind. The study would still seem to be only in the chrysalis stage, and in spite of the diversity of opinion a more exhaustive research might establish this mechanical method of age estimation.

As an anatomical study, Pryor's work upon the wrist and hand is important. After the observation of 554 wrists, Pryor summarized his chronology of carpal ossification as follows:—

- | | | |
|-----------------|---|---|
| 1. Os Magnum | { | Female: Between the third and sixth months. |
| | { | Male: Between the fourth and tenth months. |
| 2. Unciform... | { | Female: Between the fifth and tenth months. |
| | { | Male: Between the sixth and twelfth months. |
| 3. Cuneiform... | { | Female: Between the second and third years. |
| | { | Male: When about three years of age. |
| 4. Semilunar... | { | Female: Between the third and fourth years. |
| | { | Male: When about four years of age. |
| 5. Scaphoid... | { | Female: At four years of age, or early in fifth year. |
| | { | Male: When about five years of age. |
| 6. Trapezoid... | { | Female: Between fourth and fifth years (preceding trapezium). |
| | { | Male: Between fifth and sixth years (preceding trapezium). |
| 7. Trapezium... | { | Female: Between fourth and fifth years (preceded by trapezoid). |
| | { | Male: Between fifth and sixth years (preceded by trapezoid). |
| 8. Pisiform... | { | Female: Between the ninth and tenth years. |
| | { | Male: Between the twelfth and thirteenth years. |

The following observations on the ossification of the bones of the human carpus are noted:—

First. The process of ossification is inaugurated much sooner than hitherto supposed.

Second. The bones of the female ossify in advance of the male. This is measured at first by days, then months, then years.

Third. The chronological order in which the bones of the carpus are ossified is different from that formerly supposed.

Fourth. The bones of the first child, as a rule, ossify sooner than those of subsequent children of the same parents.

Fifth. Regardless of the variations (normal) the ossification is bilaterally symmetrical.

Sixth. The union of the epiphyses with the shaft takes place much sooner than formerly supposed.

Seventh. Variation in the ossification of bones is a heritable trait.

Pryor hints at the inability to estimate chronologic age from the anatomic findings, because (1) the rate of growth varies in different families; (2) conditions of health, accident, disease or anything that interferes with blood-supply and metabolism delays or modifies the process of ossification.

For anyone who may attempt to pursue this subject, the following technical necessities are outlined by Pryor: "The shadow of the nucleus is somewhat larger than the object; and the conditions under which the exposures are made should be uniform, such as the distance of the tube from the plate, the time of exposure and the development of the plate. Making all possible allowance for errors on account of these factors, and using such cases in which I have obtained negatives showing minute points of ossification, and then taking the size of the nucleus in m.m., we can estimate the times of appearance with as much freedom from error as could be determined by other methods."

Notwithstanding the pertinent criticisms of Long and Caldwell and the failure of the practical experiment at Annapolis, it may be well to outline Rotch's position briefly. Rotch believes that a knowledge of the normal anatomical changes which take place in early life may lead to the solution of many important problems connected with safe-guarding the developmental period of infancy and childhood. After an analysis of about 1,000 cases examined by the *x*-ray, he concluded that in the process of development from birth to adolescence the normal changes, which take place in the bones of the wrist, correspond so closely to those of other joints that in the great majority of individuals the wrist may be accepted as a fairly correct index of the general development. Only bright, healthy children whose development had no history of disease were tabulated. Rotch then tabulated anatomic age and the corresponding chronologic age as follows:—

- A. First year.....Os magnum, unciform.
- B. Second to third year.....Os magnum, unciform, lower epiphysis of radius.
- C. Second to third year.....Os Magnum, unciform, radius, cuneiform.
- D. Second to third year.....Os Magnum, unciform, radius, cuneiform, semilunar.
- E. Third to four year.....Os magnum, unciform, radius, cuneiform, semilunar, trapezium or scaphoid.
- F. Fifth to sixth year.....Os magnum, unciform, radius, cuneiform, semilunar, trapezium, scaphoid.
- G. Sixth year.....Os magnum, unciform, radius, cuneiform, semilunar, trapezium, scaphoid, trapezoid.
- H. Sixth to seventh year.....Os magnum, unciform, radius, cuneiform, semilunar, trapezium, scaphoid, trapezoid, lower epiphysis of the ulna.
- I. Sixth to seventh year.....Same as group H. as to number of bones, but more advanced in development.

- J.* Seventh to eighth year.....Same as group *I.*, but more advanced in development.
- K.* Ninth to eleventh year.....Same as group *J.*, but the pisiform bone appears just under the cuneiform, and all the carpal bones and epiphyses are much more massed and further advanced in development.
- L.* Eleventh to twelfth year.....Same as group *K.*, but much more advanced in development; pisiform appears plainly at lower end of cuneiform.
- M.* Twelfth to fourteenth year..Very much more advanced in development than group *L.*, and the pisiform bone almost as large as the cuneiform. All the bones of the wrist are much more developed than in any previous group.

The tables of Rotch and Pryor are almost identical.

In the practical application of such an anatomic index, Rotch suggests that *A.* represents the change from the cartilaginous wrist of the infant just before birth to a cartilaginous base containing usually, in the first year, two of the carpal bones. In *D.* and *E.* we see what may be called an ossific area corresponding to the kindergarten period; in *F.*, *G.*, and *H.*, what may correspond to grades in school; and later, in *L.* and *M.*, what may show the areas which can be utilized for suitably graded labor.

Rotch admits that his grouping is manifestly arbitrary; but he thoroughly believes that the right principle is involved, and that practical results can be accomplished in perfecting the development of children, guarding them from overstrain, both mental and physical, and in refuting misrepresentation under child labor laws, adopting athletics to anatomic rather than chronologic capacity, and in classifying children of any parentage without relying upon statements of chronology.

Rotch's conclusions, while lengthy, warrant their insertion here.

1. There is a manifest need for some developmental index by which physicians, acting as an advisory council to the people, shall be able to determine the fitness for school and for physical work of the early years of life.

2. The former means for this purpose are inadequate, whether by height, weight, teeth, statements of parents, or guardians, or birth certificates.

3. The physiological test by the pubic hair, worked out by Crampton, is an exceedingly valuable contribution, and if, as is possible, it correlates with a more practical anatomic index, it will aid in deciding in doubtful cases. It evidently, however, is not from its very nature a test which should be widely used in the schools, or courts, and it only covers a comparatively short period of life, and is one which is not applicable to many questions connected with early and middle school life.

4. Physiological conditions will probably be found to correspond to anatomical, and great credit should be awarded to Crampton for his suggestions and work directed to the future discarding of chronologic age as the most important guide in solving the problems of early life.

5. Weight and height have long been known to be very inadequate

for determining chronologic age and have been conclusively shown to be so by Crampton.

6. Pryor has shown conclusively, and my observations uphold his, that there is a marked difference in the anatomical development of children according to sex and family.

7. The consensus of opinion among odontologists is that the eruption of the teeth, as an index of age, is illusive and very unreliable.

8. The skeleton represents an illustrative steel framework of development on which the body is built, and this development, when determined, presents the best source from which to evolve an anatomic index for practical use for the safe-guarding of early life.

9. The most important part of the skeleton for use as an index lies in the joints.

10. In early life the most important part of the joints is represented by the epiphyses, which form the vital parts connected with the growth in height, as centres for infection and for the dissemination of disease.

11. The carpal bones and the lower epiphyses of the radius and ulna represent the other joints to such a degree in so many instances, are so much more in evidence, and are so readily interpreted by the Roentgen method, that they can be practically used as an index of development, representing the entire bony framework.

12. The best way of using the wrist as an anatomic index is to classify empirically the carpal bones and the lower epiphyses of the radius and ulna alphabetically in groups.

13. In addition to showing the degree of development, these groups signify degrees of possible strength, on the ground that the larger the number of bones the greater the strength.

14. The educators and school teachers should, after advising with the pediatricists, determine what degree of physical and mental development is required for the different grades of kindergarten and school, and preliminarily place in those grades the groups of children who show the anatomic index which corresponds to them.

15. In like manner, the requirements of certain physical exercises, whether in sport or in labor, should be determined in order that the special expenditure of physical and nervous force needed for such exercise can be fitted to the special child.

16. In regard to questions such as child labor, the philanthropists, and those who are especially working for the betterment of child-life, should withdraw children from unfit labor and obtain information of the child's special needs from the physicians in accordance with race, family, and other conditions of life. The physicians should also determine in what group the special child belongs, mentally and physically, and state which work it is fitted for.

17. Under the physicians' advice the lawyers should frame sensible and practical laws on a developmental basis, and the legislatures should enact such protective laws, whether for the state or the country at large.

18. While chronologic age in legal questions must necessarily be taken into account, yet, for practical reasons, and for the safe-guarding of early life, we must pay special attention to the other two types of age, the physiologic and the anatomic.

19. Finally, we must not be misled by thinking that the development of the epiphyses always means the actual general physical strength, such as may be found in an individual, as for instance by using the ergograph. The muscles may be weak and the grasp of the hand may not be up to

what is usually considered the standard; but such conditions should be considered to be abnormal, and the individual child should be treated as a sick child and not be classified by the degree of strength which it shows. On the other hand, the carpal bones and the epiphyses of the radius and ulna indicate what the development really is and has been, and the muscular strength and endurance should be worked up to the degree of development shown by this anatomic index. The individual should then be classified just as where there is an over-bright brain and a corresponding lack of epiphyseal development, and the child should be taken from study and improved physically until its anatomic index equals its brain capacity.

"The bones of the wrist, therefore, unfold to us an underlying evidence of development which can be used practically for grading early life, but this anatomic index can only be disclosed during life by means of the Roentgen ray."

We now come to the evidence produced by Long and Caldwell, which minimizes our adherence to the theories of Rotch. They exercised no selection of normals, but took all available material, selecting only the most idiotic among the idiots. First, they found that in more than one-third of their children many discrepancies between the right and left hands, and therefore doubted the value of using a radiograph of one wrist as an accurate index of the development of any other part of the body. Secondly, they found it difficult to arrive at a numerical expression for the stage of carpal ossification because of extreme irregularity in different subjects in the progress of ossification. After a seemingly exhaustive analysis of their experiments, Long and Caldwell are led to believe "that the ossification of the one wrist of an individual is not an exact index of the ossification of the other wrist, and therefore it seems probable that the same inexact relation exists between the wrist and the remainder of the skeleton. Age, height and weight increase in general with advance in carpal ossification, but with many exceptions among both sexes. They can find no relation between the degree of carpal development and quality of mind. Some idiots are as far advanced in carpal ossification as some normal children of good mentality and similar chronologic age. The relation between the stages of puberty and those of carpal ossification is too indefinite to warrant the latter's use as an index of physiological development. And, finally, though carpal development alone is not an exact index, still when observed at intervals, and considered with other factors, it may become an aid in estimating the rapidity of growth of the skeleton in children."

They believe with Rotch that closer attention should be paid by the medical profession to the regulation of physical and mental tasks more in accordance with the individual child's capacity, and hope that development of the ossification centres of the skeleton, as brought before us by Rotch, though not an index in itself, may become a factor toward this result.

The need for some means of determining the interdependence of anatomical development with mental and physical strain provoked the experiments of Smith at Annapolis. It has been noted, first, that there were great variations in size and strength among youths of the same age, and, secondly, a number of physical defects that developed among students without recognized cause. Some of the lesions could be attributed in a general way to athletics, but for the most part, since they appeared largely among individuals defective in physique, they were assumed to be manifestations of poor or retarded development.

Smith shows the dependence of this factor upon immaturity. Thinking that Rotch's method could be used to determine relative immaturity and establish an anatomic index of physical capacity for mental application, Smith took some 1654 *x*-ray plates of the hands and elbows of 914 men. He was unable to establish normals among the young men from nineteen to twenty-two years of age. The table of averages showed that among his men of nineteen to twenty-two, height, weight, and strength increase little, if at all, with increase in years; and he says that this is broadly true for anatomical development so far as it is indicated by the epiphyseal method of determination. Younger individuals are needed for this study, since the results, if found valid, will apply mainly to them. Many years would be needed to secure a reasonable number of observations in the Naval Academy on youths of suitable age, and the study can be more profitably pursued in preparatory or high schools.

His studies were stopped by his inability to determine normals, without which standardization or comparison was impossible. "It being practically only very rarely, and then in extreme cases, to say that an individual is normal, precocious, or delayed, the statistical study that was to demonstrate the value of the method was not feasible.

"The method, therefore, does not furnish among sub-adults suitable normals by means of which standardization can be carried out. In this respect it fails, as do other similar methods, to supplant the chronological system of grading, however defective that system may be. This work in no wise bears on Rotch's observations on children."

We may add another correlative experiment of interest here. Henry attempted to use the opacity of the bones to *x*-rays, as an indication of age, based upon the law of Flourens that the duration of the period of growth bears definite relation to longevity and, in particular, the time occupied by any animal in attaining its maximum stature is a definite fraction constant for all the individuals of the species of the duration of the animal life. Now, the maximum stature is attained simultaneously with the maximum development of skeleton; and as the weight of the skeleton is a function of the amount of mineral salts which it contains, the law may be expressed in a more mathematical form by saying that the percentage of mineral salts in the bones of all animals of the same species may be represented by similar curves of growth and decline, which will differ solely in the values of the individual constants.

Henry made *x*-ray exposures of the hands and then stripped the films from the plates and examined the shadows of the bones with a D'Arsonval diaphragm photometer. The opacities were expressed in thicknesses of aluminum. He found that the maximum opacity of bones occurs at the age of thirty to thirty-two; the minimum at forty-five and a second minimum at sixty-five. He believed that one could estimate the expectations of life of a given age and given opacity and thus establish life insurance premiums upon a more equitable basis than mortality tables.

It is now some seven years since Henry's experiments and nothing more seems to have come of them. There are so many factors of chance and delicacy to minimize their practical application, and, furthermore, the actuarial estimation of insurance rates from mortality tables has proved so profitable to insurance companies that there is no necessity for seeking another method.

Even after we study both sides of Rotch's method and realize that it is at present inexact, we are confronted with the necessity of just such an anatomic index of human efficiency. Rotch's method is simple, harm-

less and could be applied practically over the whole world, if an enormous amount of material could establish a reliable index of anatomic age. It would seem a fit problem for one of the large educational endowments which have recently been established. The Mendelian calculations shed much light on the problems of heredity and eugenics. The introduction of definite mechanical principles in the correlation of the anatomy, physiology and chronology of the growing child is eminently to be desired. The Rotch method is one means of evolving these calculations, and it remains for them to be established by further experiment, or the subject must be approached from another angle.

DIAGNOSTIC AND THERAPEUTIC NOTES.

NEW LIGHT ON GASTRIC ULCER.—Bergmann (*Muench. med. Wochenschr.*, No. 4, 1913). A flood of light has been thrown upon a variety of obscure affections by the work of Eppinger and Hesse on the vegetative nervous system. The latter may be divided into two mutually antagonistic and complementary divisions, one consisting of the sympathetic system, the other of the vagus and its congeners. Many neuroses and allied disorders can be more precisely defined as over-irritable conditions of one or the other of these systems, and such patients may conveniently be classified as vagotonic or sympathetotonic individuals. This differentiation has also a pharmacological significance, since members of the atropine group depress the vagal and stimulate the sympathetic systems, while pilocarpine, adrenalin and others have the opposite action.

On the basis both of a critical examination of the work of others and of his own observations, v. Bergmann adduces evidence to show that gastric or duodenal ulcer may be regarded as the consequence of a vagotonic condition. In the first place the secretory abnormalities, especially the hypersecretion, characteristic of gastric ulcer may be regarded as manifestations of a vagus over-irritability. The same is true of the pylorospasm. Moreover in 58 out of 60 cases of gastric ulcer, carefully studied from this point of view, definite evidence of a vagotonic status could be made out. Moreover, when such patients are given a bismuth meal and examined before the radioscopic screen, a spasm of the gastric musculature can often be made out, so severe sometimes as to constrict the lumen of the stomach into two non-communicating halves. This spasm is usually accompanied by much pain, and it may be that the pain of gastric ulcer is due, not to irritation of the raw surface, but to this spasm and its resulting pull upon the peritoneum.

There is reason to think, moreover, that this gastric spasm is the direct cause of the gastric ulcer. A spasm of this sort causes a nearly complete anemia of the area of gastric mucosa involved and, as Payr has shown, such an anemia is invariably followed by ulceration due to peptic auto-digestion. The chronicity of such an ulcer results from the repeated spastic constrictions at the same spot. One of v. Bergmann's assistants has shown, in experiments not yet published, that hypodermic injections of pilocarpine and physostigmine invariably cause gastric ulceration in rabbits, in one case even leading to perforation. If killed soon after injection, such animals always show marked constriction of some portion of the stomach.

One result of the above observations and considerations is to eliminate the distinction between gastric neurosis and gastric ulcer, the latter being an occasional end-result of the former. Another result is to call attention again to an old remedy for gastric ulcer—namely, atropine. This drug, according to the new views, is indicated, not because it diminishes secretion, but because of its antispasmodic, antivagotonic action. It should

be given in gastric ulcer persistently, for long periods of time. It may be that its greatest value will lie less in the cure than in the prevention of gastric ulcer. The next few years will certainly witness a great clarification of all of our notions in this field of medicine.

VENOUS ANESTHESIA IN OPERATIONS ON THE HAND OR FOOT.—Kaerger (*Archiv fuer klin. Chir.*, No. 4, 1912). The writer reports the technique in use at the clinic of Prof. Bier at Berlin. The portions of the hand or foot, that are not to be involved in the operation, are rendered bloodless by means of a spica bandage tightly applied. The veins most suitable for the injection in the hand are the branch of the cephalic vein between the first and second metacarpal bone, or the ramus dorsalis communis between the third and fourth metacarpal. From 10 to 30 c.cm. of a $\frac{1}{2}$ or 1 per cent. novocain solution may be injected, without the addition of adrenalin. The chief indication for this form of venous anesthesia is operations on the hand or foot in which conduction anesthesia is not practicable. It is contraindicated in all acute inflammatory processes, edema and gangrene.

IMPROVED CIRCULATION INDUCED BY LIGATION OF VEINS.—Ney (*Rev. de Chir.*, No. 12, 1912). When for any reason it becomes necessary to ligate one or more large arteries supplying a limb, the result obviously is a great fall in pressure in the distal portions of the limb. The pressure may be so low as to interfere seriously with the nutrition of the part and to involve the danger of gangrene. The greater the venous supply to the limb, the lower the capillary pressure in the distal parts will be, and the poorer their nutrition. In such a case the situation will be greatly improved if the veins corresponding to the obliterated arteries are also ligated. The indication for ligating the vein may be ascertained during the operation itself. If, after tying off the artery, the extremity becomes pale, and if, thereupon, pressure on the corresponding vein causes a return of the normal color, the vein should be promptly ligated.

GALLSTONES.—Moynihan (*Brit. Med. Journ.*, January 4th, 1913). Sir Berkeley Moynihan has long contended that in the diagnosis of gallstones the anamnesis is far more significant than the physical findings. He summarizes the most significant of the earlier symptoms as follows:—

The patient complains of a fullness in the epigastrium, coming on soon after meals, induced chiefly by 'greasy' articles of food and relieved usually by belching, instantly by vomiting. There may be discomfort, increasing perhaps to violent pain, in the upper abdomen, which is relieved somewhat by bending the body forward or by flexing the right thigh on the abdomen. Nothing tight can be endured about the waist during such an attack. There is often complaint of heartburn and of sour belching. The patient, during an attack, may notice a 'catch' in his breath, so that it is impossible for him to breathe deeply without feeling a sharp pain at the right costal margin. After a more than usually severe attack of supposed indigestion, the right side may feel stiff for

several days. A frequent and very characteristic early symptom of cholelithiasis is the occurrence, during an attack of indigestion, of a slight sensation of chilliness, especially in the evenings after a meal. This may vary from a sensation of 'goose-flesh' to a genuine slight rigor. These symptoms occurring in connection with an intractable indigestion justify the diagnosis of gall-stones, even in the absence of definite physical findings. Once the diagnosis has been made, prompt operation is always indicated unless there are grave reasons forbidding surgical interference.

PLEXIMETRIC AUSCULTATION.—Fernet (*Presse Méd.*, December 14th, 1912). If the bell of the stethoscope is placed in the supraspinous or infraspinoous fossa, and the clavicle and first and second ribs are percussed anteriorly, the resulting sound will have two phases: a sharp, short sound, followed by a more prolonged metallic vibration. The slightest lesion in the upper lobe of the lung will interfere with the production of the second portion of the sound.

ANTITOXIN ADMINISTRATION.—Park (*Boston Med. and Surg. Journ.*, January 16th, 1913). In administering antitoxin it is essential that the full dose be utilized by the body as promptly as possible. When antitoxin is given hypodermically, the watery constituent is quickly absorbed, leading to the inference that the antitoxin too has gone into the circulation. This is not, however, the case. The important globulins remain in the subcutaneous tissue and are only slowly absorbed in the course of days. It is far more effective, as well as more economical, to administer the antitoxin intravenously. In that case, all of the antitoxin acts at the time when its influence is most needed. Park is not an advocate of the enormous doses recommended by some clinicians; 10,000 units of diphtheria antitoxin given intravenously suffices in children. Larger doses are not harmful but merely unnecessary.

In tetanus, 20,000 units should be injected intravenously at the very first sign of the disease. If only a smaller quantity is available, this should be given at once, time being more important than quantity.

PAROTIDITIS IN PLUMBISM.—Klippel and Chabrol (*Paris Méd.*, January 11th, 1913). The writers maintain that a swelling of the parotid gland is a frequent manifestation of lead poisoning. The swelling is characterized by its slow and insidious onset; it is bilateral, indolent, chronic, benign, and afebrile. It is probably caused by the gradual elimination of lead in the saliva.

SALVARSAN IN PERNICIOUS ANEMIA.—Maynard (*Brit. Med. Journ.*, January 11th, 1913). In contrast to the frequent reports of brilliant results following salvarsan injection in pernicious anemia, the writer reports a case in which no benefit was derived from the treatment.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

During the last month many papers have been published, and not a few addresses delivered, that are of considerable interest both to physicians and surgeons. I may refer, amongst others, to the very practical Lettsomian Lectures, delivered by Mr. James Berry, before the Medical Society of London, in commemoration of the memory of I. Lettsom, the famous Quaker physician and founder of the Society. Mr. Berry took for his subject the surgery of the thyroid gland, with special reference of exophthalmic goitre; and it may be said that his remarks were illuminated by a wise and cautious, though progressive conservatism (if that be not a contradiction in terms), the opinion being expressed that exophthalmic goitre is a disease of which the treatment should be carried out jointly by the physician and surgeon. Mr. Berry went on to say that the time has perhaps arrived when physicians should recognize that they can do little, or nothing, for the actual cure of exophthalmic goitre, yet that they can do much to get the patient into a proper condition for operation. On the other hand, the surgeon should recognize the value of medical treatment as a preliminary to surgical interference, and should remember that there are stages of the disease during which the patient should be entirely in the physician's hands. Venturing into the region of pure speculation, as he himself said, Mr. Berry suggested that the thyroid plays a much more important part in the chemistry of the blood salts, and especially of the alkalies and alkaline earths, than is generally supposed. The value of iodine in simple goitre, the beneficial effect of sodium phosphate in Graves' disease, and the use of calcium lactate in the prevention of tetany were all referred to, as well as the possible advantages arising from the free resort to common salt before operating on cases of exophthalmic goitre.

In connection with the study of the thyroid gland an interesting point has been again raised by Dr. Langmead. It appears that Major McCarrison, whose studies on cretinism and goitre in Chitral and Gilgit were recently referred to by me, pointed out in a now almost forgotten contribution recorded in the *Lancet* of October 31st, 1908, that, in Gilgit and in Chitral there are, apart from the ordinary cases of myxedematous cretinism, others which he has called those of 'nervous cretinism.' Such cases exhibit some indications of cretinism, in association with a kind of spastic diplegia, and are, in McCarrison's experience, amenable to thyroid treatment, both in respect of their cretinism and their spasm. Dr. Langmead showed such a case a few days ago, at the Section for the Study of Disease in Children of the Royal Society of Medicine; and

an account will appear in the "Proceedings" for April. A number of very interesting problems are presented to us by this observation of McCarrison's; and there is seemingly some justification for the treatment of quite early cases of spastic diplegia in children, especially when associated with mental defect, by thyroid extract. Certainly, the relation of spasm generally to interference with the calcium metabolism, to the thyroid, and to the parathyroids, is deserving of some attention in this connection.

Mr. Berry's lectures will be found in the *Lancet* for March 1st, 8th, and 15th, 1913.

The Lumleian lectures, delivered before the Royal College of Physicians, by Dr. de Havilland Hall, will also be found reported fully in the *Lancet* for March 22nd and 29th, and April 5th. They are concerned with the topic of "Intrathoracic Aneurysm," a subject that has always had a fascination for British physicians, and Dr. Hall's account of the disease is admirably compendious. He does not, however, apparently contemplate that the wonderful work of Carrel, by way of intubating the aorta, will yet awhile, at any rate, remove the care of such cases from the province of the pure physician.

In a supplementary issue, that has only just been published, of the "Proceedings of the Royal Society of Medicine" for March, 1913, appears the first part of the report of the important discussion on "Alimentary Toxemia, Its Sources, Consequences and Treatment," that has recently been conducted at special meetings of the Society.

In opening the debates, Dr. Hale White adopted a somewhat critical attitude, placing considerable emphasis on the lacunæ in our knowledge, and saying, with much truth, that those who ascribe most to alimentary toxemia are unable to tell us what the poisons really are. Dr. Andrewes, who dealt with the subject from a bacteriologist's point of view, laid down the propositions that in many cases the poisoning is by foreign proteins as such, the defect lying with the liver which should shield the body from their effects; that the main effect of bacterial activity in the production of alimentary toxemia lies in the carrying out of abnormal protein cleavages, with which the natural resources of the body cannot cope; and that there is little evidence that true toxins derived from the ordinary flora of the gut play much part in the production of alimentary toxemia.

Dr. Vaughan Harley discussed some chemical questions at issue, and Dr. Saundby read a paper on the medical point of view, while Mr. Colyer referred to the odontological aspect of the subject.

The most important address, however, was without question that delivered by Mr. Arbuthnot Lane, who, beginning at the very beginning, dealt with the effects produced on the skeleton and on the soft parts by pressure and by strain, and recapitulated his well-known views on the production of 'bands,' and then proceeded to picture brilliantly the group of effects that follow, or are associated with the development of the structural changes that he first described. In relation to what Mr. Lane described as one of his difficulties—namely, the point that the presence of these bands and adhesions have been described and regarded as due to inflammation, it is interesting to bear in mind that Prof. Keith, in his Hunterian lectures, to which I referred last month, told us that microscopical investigations have lately shown that some of the processes concerned in the formation of peritoneal folds in the fetus are indistinguishable from those involved in the production of inflammatory adhesions.

Mr. Lane's address was one of the most brilliant that he has yet delivered, and made a considerable impression, even on many who have hitherto thought his views chimerical and his operations unwarranted.

There is certainly a far more general feeling, now than hitherto, that many of our hard-and-fast notions of the last two decades stand in need of revision, and the heretic, or the unorthodox has, therefore, a better hearing than he had a few years ago.

In relation to what I wrote recently, in your columns, concerning Dr. Bastian's views, on abiogenesis, and heterogenesis, I would refer to the paper recently read by Drs. Thiele and Embleton, and published in the "Proceedings of the Royal Society of Medicine" for February. There, some views on the pathogenicity and virulence of bacteria are enunciated, which, if the author's work is substantiated by others, will involve not merely the revision, but the scrapping, of a great deal that we have, till lately, confidently believed. Apparently Drs. Thiele and Embleton are to be numbered amongst those who hold that the tubercle bacillus can be derived, in the laboratory, from forms which we have not hitherto regarded as pathogenic. This being so, they are perhaps indirectly supporters of some of Mr. Lane's notions concerning the relation of intestinal stasis to tuberculosis.

April 10th.

PRACTICAL MEMORANDA.

By WM. T. COUGHLIN, M. D., of St. Louis.

The treatment of paronychia seems not to be well understood by the average general practitioner. We are led to believe so by the histories given by paronychia patients who present themselves in the clinic, and by the conditions presented after their having been treated for longer or shorter time by practitioners.

In paronychia either pus is present or it is not. If no pus is present, cutting is not needed. Loosen the lunular fold from the nail along its free edge. Lay a strand or two of gauze thread between the nail and the fold, wrap in sterile gauze soaked in 90-95 per cent. alcohol, and put the finger on a splint. Give the patient a bottle of alcohol and order it used often enough to keep the dressings wet. In twenty-four hours it



will be so much better that the patient will want to discard the splint. Continue the treatment for another twenty-four hours, however.

If pus be present it will lie over the nail or under it or both over and under it. If over it alone, incise the lunular fold quite across the red swollen area in the direction shown in the figure, and only deeply enough to go quite through the fold. One incision may be enough; but, if the process extends across the base of the nail, it will not. You will never need more than three. Turn back the flaps of lunular fold thus cut, and lay a little bit of gauze between them and the nail. Apply a two per cent. aluminum acetate pack. Put the finger and the whole hand on a splint. Continue the wet pack and splint till all redness disappears. Continue the finger splint till healing occurs.

If pus be under the nail it is under the base or the side or both, and can generally be seen showing yellow through the nail. In case this obtains, as well as making the incisions mentioned in the preceding paragraph, cut away that portion of the nail which covers the pus and then apply the pack and splint as before.

Some advocate the alcohol pack whether pus be present or not. Where pus is present we have had better results with the aluminum acetate. If you use an alcohol pack do not cover it with oiled silk or rubber tissue.

You cannot make the incisions nor remove a portion of the nail properly unless the patient feels no pain. Either anesthetize the finger or the patient.

An ordinary wooden tongue-depressor makes a splendid finger splint.

One hears a good deal of the benefit derived from the use of serum in cases of persistent bleeding, *e. g.*, in the newborn, the icteric, and in hemophilia; and many such cases successfully treated have been reported. The trouble is that many of our readers are so situated as not to be able to procure at once horse-serum when they want it. Diphtheria antitoxin has been used, but has never become popular. Should you be unable to procure the horse-serum, try human blood. Do not try to make a serum from it. With a sterile syringe draw blood, 15 to 30 c.cm., from a vein of father, mother, sister or brother of the patient and at once inject it into the subcutaneous tissue of the patient. You may repeat the procedure in eight to twelve hours and you will hardly have to use more than three injections.

The question of when to allow a patient solid food after an operation on the intestinal canal is an important one. The answer should be: Not until healing has occurred. We have no evidence to show that wounds in the bowel heal more rapidly than wounds on the surface of the body, and here in clean wounds at least ten days are allowed for good healing. But wounds in the bowel are not clean wounds. It is therefore reasonable to suppose that they should require longer to heal. While it is true that the suture line on the peritoneal surface is soon covered over with fibrin and that healing on this surface is by first intention, inside the bowel all is different and here we have healing by second intention. Wait at least three weeks, and if then there be blood in the stool after solid food has been begun or if the patient's temperature rise, discontinue it. After a clean case of appendectomy the patient may eat almost any kind of solid food in ten days.

If you have had an abdominal pus case, allow no solid food while drains are in place, nor for four days after their removal. If the temperature has remained normal for four days, and no other contraindication exist, allow solid food sparingly at one meal. Wait till that meal has had time to pass before trying the next. An elevation of more than one degree should be a sign to return to liquids only but 'no milk.'

In case of menorrhagia or metrorrhagia without any apparent local cause take the coagulation time of the blood.

Sugar (glucose) dressings of wounds and ulcers are being advocated in some quarters and may be worth giving a trial. They may be used either wet or dry. Their best results are seen in wounds of recent origin. Their advocates claim that instead of injuring a certain number

of the living cells, as most antiseptic dressings do, they actually bring food to the cells.

The wound is washed with an isotonic solution* of glucose in sterile water at a temperature of 120° F., and is then either covered with oiled silk or rubber tissue wet with the same solution or a wet dressing is applied in the usual way with gauze wrung out of the solution.

In the dry method, after cleansing the wound as above, it is powdered over with finely pulverized glucose and covered with dry gauze and cotton.

Infected wounds are dressed daily until nearly clean and then less often. Chronic ulcers are dressed only twice a week.

As might be expected the greatest benefit is seen in recent slowly healing wounds. In chronic cases no benefit may be noticed until after the fifth or sixth dressing, after which progress is more rapid.

If the dressing causes pain, do not continue to use it.

*Locke's solution may be used.

BOOK REVIEWS.

THE THEORY OF SCHIZOPHRENIC NEGATIVISM. By Professor Dr. E. Bleuler, Professor of Psychiatry, University of Zurich; Director of Burghoelzli Asylum. Translated by William A. White, M. D., Superintendent of the Government Hospital for the Insane, Washington, D. C. New York: The Journal of Nervous and Mental Disease Publishing Company. 1912.

This is No. 11 in the Series of the Nervous and Mental Disease Monographs favorable mention of which has frequently been made in the book reviews in this Journal. There is, perhaps, no subject which has aroused greater interest among the neurologists than dementia præcox, and Bleuler, the author of the present monograph, has written, perhaps, more illuminatingly and has thought more originally on this subject than any other living writer. Recently, Bleuler has written in the new "Handbuch der Psychiatrie" chapters on dementia præcox, some 400 pages or so, in which he extended the original Kræpelinian idea of dementia præcox in a very remarkable way. As an introduction, perhaps, of a proper conception of his notions, the present translation by Dr. White on negativism is of great value, as it renders as clear as the subject can possibly be rendered at present the groundwork of negativistic phenomena in dementia præcox.

This monograph of Bleuler contains matters of the deepest interest and importance, and though it is difficult reading and some of the distinctions are a bit involved, and there seems to be a certain lack of clearness of many of the terms, yet these are imperfections which are inherent in the subject itself.

The most important part of Bleuler's theory of negativism is its close relationship to some of the theories of Freud. There is one thing that seems very evident, and that is, before one can understand clearly the shut-in personality of the præcox—or, as Bleuler calls it, the autistic withdrawing of the patient into his fantasies—it is necessary clearly to comprehend the emotional blocking theory of Freud. When a full grasp of this notion is obtained (which Bleuler in this monograph makes comparatively easy), then one is immediately in possession of an important psychological point of view, which to a certain extent unlocks some of the mysteries which lie between a dementia præcox as a patient and the physician who is examining him.

This little monograph of only 36 pages should be read carefully, and should be thoroughly digested by all those who desire to understand, as far as possible, the most curious and one of the most important of mental diseases—that is, dementia præcox.

A word of commendation should be given to the translation which is clear, readable and sufficiently rigid to make one feel that White comes very close to saying in English just what Bleuler has said and meant to say in German.

AN ATLAS OF THE DIFFERENTIAL DIAGNOSIS OF THE DISEASES OF THE NERVOUS SYSTEM. Analytical and Semeiological Neurological Charts. By Henry Hun, M. D., Professor of the Diseases of the Nervous System in the Albany Medical College, etc. etc. Troy: The Southworth Company. 1913. Price, \$5.00.

This is a difficult book to review. It is an attempt, apparently, to tabulate in a systematic and didactic way all the knowledge that we have of the important diseases of the nervous system, as the author says, by analytical and semeiological neurological charts. It might be said in the beginning that this book shows all the evidences of an immense industry, an immense patience. How anyone could tabulate in some 300 pages all this data and plan out all the complicated, difficult arrangements of symptoms, number them and letter them, is beyond the imagination of the reviewer. Everything is here, but everything lies disconnected and out of touch with the real and the living. If one were granted a memory beyond the imagination of most of us at the present time, and could keep in his own mind the tabulations that are printed in this book, one would become, no doubt, the same kind of a neurologist that this book is a treatise on neurology. For example, case-taking is divided into 79

different procedures, and the analysis of the subjective symptoms and mental activity bring the number up to 204. When everything is analyzed, we find that there are 465 different things to know before we are in a position to study an individual case. This number is greatly extended by further charting. If it were possible for one to keep away from the terrible influence of numbers, perhaps one could read, or use, these charts to some advantage, but when, for example, vertigo is numbered 937 and other familiar and friendly terms are numbered in other ways, the poor reader begins to think that he is trying to solve a picture puzzle of a very intricate sort and turns away depressed and discouraged.

In the past many attempts have been made to tabulate and pigeon-hole medical knowledge. This is an ambitious effort as far as neurology is concerned, but it has failed for the same reason that the others have failed, and that is, that diseases are not abstract knowledge or abstract facts, but living realities.

With every admiration granted for the industry, accuracy and enthusiasm which must have prompted this work, the reviewer is nevertheless forced to conclude that as an aid to the real knowledge of neurology, it is of little value. It is a book that stands as a monument to the author's industry, but the chances are that it will never be fingered and used and become a living part of the neurologist's daily life.

THE SURGERY OF THE SKULL AND BRAIN. By L. Bathe Rawling, F. R. C. S., Surgeon, with Charge of Out-Patients, Senior Demonstrator of Practical Surgery, Demonstrator of Operative Surgery, St. Bartholomew's Hospital, etc. etc. New York and London: Oxford University Press. 1912. Price, \$6.00.

The purpose of this book by Rawling is to give, in a comparatively brief way, the facts and experiences which he has had in operations on the skull and brain. A book of this kind is of great value to the surgeon and to the neurologist, because it brings to each of them in a tangible way the necessary facts lying in their common territory. Naturally, in this book emphasis is placed upon the surgical side of the question.

Of considerable value is the statistical consideration of various affections of the brain and skull. These are, apparently, brought up fairly well to date, though in some of them the most recent reports have not been included. For example, in the statistics of the psychical disturbances found in brain tumor, the statistics of Schuster, dating from 1903, are the only ones mentioned. There has been considerable progress in the last five years, enough, apparently, seriously to question some of the conclusions advanced.

The general symptomatology of the affections of the brain and spinal cord is well given and shows distinctly the traces of English clinical methods.

The illustrations, on the whole, are well chosen. Exception might be taken to some of the diagrams, particularly those devoted to cerebral localization. In some of these, motor localization for the lower extremities might be questioned.

While this volume of the Oxford Medical Publications can in no sense be called an unusual, epoch-making book, yet its value is undoubted, particularly so in the compactness of its descriptions and the simple and clear way in which the author's experiences and conclusions are set down. As an easy reference book for important questions in regard to the operative technique, localization and general clinical considerations, the book should have a place in the library of a surgeon, or neurologist.

ENZYMES. By Otto Cohnheim, A. O., Professor of Physiology, Heidelberg. Six Lectures, Delivered under the Herter Lectureship Foundation, at the University and Bellevue Hospital Medical College. First Edition, First Thousand. New York: John Wiley and Sons. 1912.

There is no branch of biological investigation that promises to throw more light upon metabolic procedures than the study of ferments. Up to the time of the fundamental discoveries of Buchner, the fermentative processes due to soluble enzymes and to those of the yeasts and bacteria were thought to be radically different in kind. The discovery and isolation of zymase, the active principle of yeast, gave a great impetus to the study of these processes and led it into new channels, the method of investigation being now primarily chemical. As yet we are but on the threshold of this science. Much work has been done upon those ferments that are either secreted by the glands or, at any rate, can be extracted from them or from other tissues. Even here we are constantly

on the verge of the unknown. Of the great number of highly important enzymes that act only within the cells, that is upon substances as they pass through the cells, little or nothing is known. Examples of this last group are the enzymes that recombine the amido bodies into proteins or the soaps and glycerine into fat, as these substances pass through the intestinal wall. It is probable that nearly, if not quite all of the vital processes of cells are examples of enzyme action.

Prof. Cohnheim's book is a succinct account of the present content of the science. If it is somewhat dogmatic, and if he sometimes yields to the temptation of emphasizing his own theories at the expense of those of his colleagues, this fault is more than compensated by the freshness and precision of the presentation. The reader will notice with pleasure the pains taken by the author to give full credit to the work of foreign investigators, especially Americans. This is a characteristic not universally found among European authors.

GUIDE TO MIDWIFERY. By David Berry Hart, M. D., F. R. C. P. E., Lecturer on Midwifery, School of the Royal Colleges, Edinburgh; Formerly Obstetric Physician, Royal Maternity and Simpson Memorial Hospital, Edinburgh, etc. etc. With 4 Illustrations in Color and 268 Diagrams. New York: Rebman Company. 1912. Price, \$6.00.

This volume of 800 pages has been prepared in a distinctly original and eminently practical form. Its scope is best described in the author's own words:

"This Guide to Obstetrics has been written in two parts. In Part I a succinct and modern account, 603 pages in all, of the facts of Obstetrics has been given, and the science of the subject dealt with so far as it is known. In this way the student and practitioner have placed before them the necessary facts for a first reading of one of the most important subjects in Medicine.

"To each chapter, where necessary, a scheme of practical instruction has been added, and this should prove of great use to the individual student and in tutorial work.

"In Part II, in the form of Notes related to the Chapters in Part I, there are discussed historical questions, previous views of the nature of such diseases as eclampsia, hyperemesis gravidarum, and other pathological conditions still in dispute; and various new lines of research and treatment in puerperal pyæmia, for instance, are also fully considered; new operative procedures—pubiotomy, extra-peritoneal Cæsarean section. The ligature of thrombosed pelvic veins in puerperal pyæmia is described and discussed, so that the senior student and practitioner, proposing to specialize, are placed in touch with the latest information in such subjects.

"A chapter has been written on Evolution in its bearings on Obstetrics."

This division of the work into two parts, one for the junior, the other for the senior and the more advanced, is an entirely new feature in systematic textbooks, an innovation which will give this volume a prominent place among the many textbooks of obstetrics.

DISEASES OF WOMEN. By Thomas George Stevens, M. D., B. S. (Lond.), F. R. C. S. (Eng.), M. R. C. P. (Lond.), Obstetric Surgeon, with Charge of Out-Patients, St. Mary's Hospital, Paddington Surgeon (Gynecological), The Hospital for Women, Soho Square, etc. etc. With 202 Illustrations. New York and London, etc. etc. Oxford University Press. 1912. Price, \$5.50.

This book seems to deserve more than perfunctory mention of its appearance. First of all it offers some distinct features, which, in the opinion of the reviewer, render this volume unusually valuable as a text for teachers. An arrangement based on the pathology and etiology of gynecological diseases has been attempted by several authors of textbooks; it undoubtedly is the arrangement most desirable from the standpoint of the teacher. But it is probable that no other author has succeeded so well in carrying out such a plan and at the same time grouping all gynecological conditions in logical order and without the necessity of repetition as has Stevens in this work. He also proves to be an expert illustrator, his own drawings being clear and instructive. His new method of photographing epidiascopic enlargements of microscopical sections, instead of using the older method of microphotography, has enabled him to present excellent plates of characteristic histological pictures. And finally an important factor, which is a decided asset to the value of Stevens' work, is that the text reflects Hirschmann and Adler's most recent investigations of the histology of the endometrium and the latest modifications of Wertheim's cancer operation.

TEXTBOOK OF OPHTHALMOLOGY. In the Form of Clinical Lectures. By Dr. Paul Roemer, Professor of Ophthalmology at Greifswald. Translated by Dr. Matthias Lanckton Foster, Member of the American Ophthalmological Society, etc. etc. With One Hundred and Eighty-six Illustrations in the Text and Thirteen Colored Plates. Volumes II and III. New York: Rebman Company. 1912. Price, \$2.50 each.

The present review is concerned with Vols. II and III. Vol I, which appeared about a year ago, was favorably commented upon in the JOURNAL, August, 1912. This work deserves more than passing notice for a variety of reasons. In the first place, the subject is presented in the form of a series of clinical lectures, instead of being divided into formal and (shall we say) stereotyped chapters. This method should a priori tend to an unfettered expression of gratitude from the reader accustomed to the stilted paragraphs of the average textbook. The ordinary familiar language of the clinic is employed by Roemer with consummate skill to paint a vivid picture of the clinical and pathological aspects of the actual patient. The application of the results of the study of immunity to diseases of the eye and, indeed, the study of immunity itself are developed more thoroughly than in other textbooks. Conflicting theories in regard to details of anatomy, physiology, etc., are contrasted, and, finally, the author's own opinion on moot points is logically and clearly expressed.

The illustrations, photographic and otherwise, are beautifully executed. The colored plates, also, represent, with remarkable fidelity of drawing and coloration, various external ocular diseases. No practitioner interested in diseases of the eye, whether specialist or not, can afford to be without this splendid work.

SOLIDIFIED CARBON-DIOXIDE in the Successful Treatment of Cutaneous Neoplasms and Other Skin Diseases, with Special Reference to Angioma, Epithelioma and Lupus Erythematosus. Fully Illustrated. By Ralph Bernstein, M. D., Philadelphia, Pa., Clinical Instructor in Skin Diseases, Hahnemann Medical College, Philadelphia, Consulting Dermatologist to the Women's Southern Homeopathic Hospital, etc. etc. Hammond, Ind.: Frank S. Betz Company. 1913.

Quite a delightful little book of 91 pages and startling in its scope and practicability. The reviewer believes, however, that the author is far too sweeping in his statements about the remedy which he advocates—namely, carbon-dioxide snow; yet the text shows quite a varied and wide experience in its use. For instance, he recommends the agent in lupus vulgaris and other tuberculous processes of the skin; and in epithelioma, rodent ulcer and other malignant processes. This remedy is, however, recommended by many others in these diseases. Yet the reviewer fears that its effect is too superficial and transient for this class of affections. The author remarks: "I am led to believe, however, from clinical experience during the past five years in the treatment of epithelioma, that we may have at last reached a cure in carbon-dioxide for epithelioma." Despite this sweeping statement, it should be stated here that the general use of such a remedy for epithelioma is dangerous except in very superficial, selected cases. The author goes very thoroughly into the action and therapeutic indications for the carbonic snow, and gives detailed directions for its use. The book should be of undoubted practical value to the practitioner. The illustrations are excellent; but the text, we fear, is a little too enthusiastic.

VAGINAL CELIOTOMY. By S. Wyllis Bandler, M. D., Adjunct Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital. Octavo of 450 Pages with 148 Original Illustrations. Philadelphia: W. B. Saunders Company. 1912. Price, \$5.00.

This is the only complete presentation of the problem of vaginal celiotomy ever presented to the English speaking physician. The vaginal route for abdominal operations, while first introduced into surgery by French gynecologists, was actually developed, rendered practicable, and made popular in Germany, the number of volumes in the German language dealing with vaginal celiotomy attesting this fact. Bandler's work easily ranks with the best of them, chiefly on account of the fact that the clearly written text is unusually well elucidated by carefully selected and well-drawn illustrations showing every step of every operation that can be performed by the vaginal route.

Nevertheless, we feel restrained in prognosing success for this volume. Vaginal operations similar to bimanual vaginal examinations require a specific technique which cannot be learned by descriptions or the best of illustrations, but are de-

pendent upon extensive actual experience. In this country the abdominal route was always the route of choice, and gynecologists never grew as enthusiastic over vaginal operations as did some of our German colleagues. Vaginal operations were denounced by American gynecologists as unsurgical, and influenced by the fact that even to-day in Germany the enthusiasm for this sort of operation is on the wane, it cannot but be admitted that before long the vaginal route will be altogether abandoned. This is to be regretted; and a remark here that is opportune is that this attitude could have been avoided had books similar to this one been published several years ago. At present, however, good as is Bandler's effort, it must be regarded as out of date.

DIGESTION AND METABOLISM. *The Physiological and Pathological Chemistry of Nutrition. For Students and Physicians.* By Alonzo Englebert Taylor, M. D., Rush Professor of Physiological Chemistry, University of Pennsylvania, Philadelphia. Philadelphia and New York: Lea and Febiger. 1912. Price, \$3.75.

As a textbook on metabolism in the English language this work fills a much felt want. There have in recent years been added to our available library many good works on dietetics, but for a knowledge of the metabolism upon which every rational system of dietetics must be based, we were forced to consult works in a foreign tongue, or some English translation, the best known being probably that of the von Noorden essays. The present work is, therefore, doubly welcome, first as a pioneer in the English language, and then for its inherent excellencies as a textbook. The author's style is singularly clear,—that of the teacher who recognizes the needs and the limitations of his students. The first chapter is devoted to a brief consideration of the chemistry of food-stuffs, dealing with broad chemical principles rather than with a multiplicity of formulæ and "percentage compositions." The second chapter on *The Theory of Ferment Action* is, perhaps, the most interesting and suggestive of the book, including as it does some of the more recent work in physical chemistry as applied to the study of physiological problems, and pointing the path along which much of our future progress on the subject seems likely to be gained. Then follow chapters on digestion, the metabolism of fats, carbohydrates and proteids, a chapter on the metabolic process in its entirety both under normal and abnormal conditions, and a concluding chapter on the regulation of the body temperature. The work is indispensable to a good library.

DISEASES OF THE HEART AND AORTA. By Arthur Douglass Hirschfelder, M. D., Associate in Medicine, Johns Hopkins University. With an Introductory Note by Lewellys F. Barker, M. D., LL. D., Professor of Medicine, Johns Hopkins University. 344 Illustrations by the Author. Second Edition. Philadelphia and London: J. B. Lippincott Company. Price, \$6.00.

The second edition of Hirschfelder's book is as gratifying as the first. It is still the only book on the heart which so well combines physiological and clinical observations that the reader may follow and understand the most recent teachings and discoveries.

In this work we find the relation of the arrhythmias to the other clinical data clearly defined. The electrocardiogram, which was in its infancy at the appearance of the first edition, is fully treated in the new edition. The chapters on treatment are again complete, and the exhibition of digitalis and strophanthin has received a thorough discussion according to the recent practices of McKenzie and Frankel and the experiences of the author. The new light which the electrocardiogram has thrown on heart-block and on paroxysmal tachycardia is brought clearly and concisely to the reader's attention. Most pleasing of all is the space given to so-called accidental murmurs—the murmurs most often heard and most confusing. It is needless to say that one who wishes to treat diseases of the heart with a full understanding of the new, as well as of the old, findings should have this volume within easy reach.

A MANUAL OF ELEMENTARY ZOOLOGY. By L. A. Borradaile, M. A., Lecturer in Zoology in the University of Cambridge and in Natural Sciences at Selwyn College. New York: Oxford University Press. 1913. Price, \$3.75.

In this volume no attempt is made to treat the science of zoology in an exhaustive manner. The book is rather to be regarded as a series of lessons on the animals most often studied in courses on elementary zoology.

After an introductory dissertation on the general subject of the animal organism, the author takes up the frog and discusses its features in considerable

detail. Then types of various groups (*Amoeba*, *Paramecium*, *Hydra*, *Obelia*, *Distomum*, *Taenia*, *Lumbricus*, *Astacus*, *Periplaneta*, and other insects, *Anodonta*, *Amphioxus*, *Scyllium*, the pigeon, the rabbit, etc.).

Various special chapters on reproduction and sex, classification and evolution and the animal in the world are intercalated in appropriate places. The work is illustrated with about 300 illustrations, among which are numerous original figures, and nearly all of which are of merit. A short appendix deals with methods of practical work, and the book is provided with a good index.

The work can be recommended as a useful textbook on elementary zoology. The reviewer would have preferred to see the chapter on the frog in its logical place according to the scheme of the book, but this is a minor matter. A more serious criticism is the small attention given to practical zoological methods, which would preclude the book being used in the laboratory.

A TREATISE ON PELLAGRA. For the General Practitioner. By Edward Jenner Wood, S. B., M. D., Chairman of the Pellagra Commission, North Carolina Board of Health; Member of the American Society of Tropical Medicine; Fellow of the London Society of Tropical Medicine and Hygiene, etc. With Thirty-eight Illustrations in Text. New York: D. Appleton and Company. 1912. Price, \$4.00.

One of the most important chapters in medical history is that dealing with pellagra. Opportunity has been offered a few to watch the development of an entirely unknown disease on virgin soil, as well as to observe the evolution of that disease throughout all the stages of adaptation to a new field. In importance, the study of pellagra has been almost as great socially as medically. The above volume is one of the many books which have appeared upon this subject in this country in the last few years. It presents an elaborate abstract of literature derived from German, French and Italian sources. For this reason it should be of special value for those interested in this subject, who are not familiar with the foreign languages. None of the chapters are entirely complete, and they appear to be intended for the use of the general practitioner who only uses an abridged discussion on this subject. While the author does not believe in the maize theory, he presents the etiology of pellagra from the standpoint of the zeist as well as the anti-zeist. The clinical discussion, as well as histological studies, is based upon the actual investigation of many cases. For this reason, this book should appeal to earnest medical investigators, as well as to the vast majority of practitioners who have been forced to acknowledge that a better understanding of pellagra has demonstrated that it is not an unusual disease.

FOODS: THEIR ORIGIN, COMPOSITION AND MANUFACTURE. By William Tibbles, LL. D., M. D. (Hon. Causa), Chicago, L. R. C. P. Edin., M. R. C. S. Eng., L. S. A. Lond., Medical Officer of Health, etc. etc. London: Baillière, Tindall and Cox (Chicago Medical Book Company). 1912. Price, \$5.00.

Within the past few years, scientific dietetics has come to occupy a more and more important position in American and foreign medical literature, due, no doubt, to the fact that the skilled internist has come to a better realization of the valuable therapeutic aid which, upon occasion, proper dieting offers. Skill in dietetics presupposes at least a working knowledge of the composition of food-stuffs, and it is here that this book can give valuable aid. It is not a work in dietetics, its scope being limited to the origin, composition and manufacture of foods, and this information is presented in a thoroughly interesting manner. However, the book would gain considerably in value, at least for American readers, were the caloric values of the various food-stuffs more often given, and the few values given made more easily accessible to the reader.

TUBERCULIN IN DIAGNOSIS AND TREATMENT. By Louis Hamman, Associate in Medicine in the Johns Hopkins University and to the Johns Hopkins Hospital and Samuel Wolman, Instructor in Medicine in the Johns Hopkins University. New York and London: D. Appleton and Company. 1912.

The newer methods of diagnosis, stimulated by the discovery of von Pirquet, have re-awakened considerable interest in the value of tuberculin treatment. This is evidenced by the extensive literature on this subject, from which certain crystallized facts are gradually clearing up the effect of this specific toxin. This volume deals with the practical application of tuberculin, the diagnosis and treatment, and the general principles that underlie its action. While these principles are far from clear, this work has resulted in suggesting many interesting and fruitful points of view in entirely new directions, for it attempts

to familiarize the inexperienced with the general truths known about tuberculin and its application. In order to do this, it acquaints the reader with the knowledge of the process leading to spontaneous recovery, which occurs in tuberculosis, and the part that tuberculin plays in instituting or assisting such a favorable result. In doing this, the aim of the authors has been accomplished. It is a book that should serve as a guide to those interested in the use of tuberculin and, undoubtedly, as a reliable and practical informant on the subject up to date.

THE CLINICAL PATHOLOGY OF SYPHILIS AND PARASYPHILIS AND ITS VALUE FOR DIAGNOSIS AND CONTROLLING TREATMENT. By Hugh Wansey Bayly, M. A., M. R. C. S., L. R. C. P., Pathologist to the London Lock Hospitals. Clinical Pathologist to the National Hospital for the Paralyzed and Epileptic, etc. etc. New York: William Wood and Company. 1912. Price, \$2.25.

There have been a number of these little books on this subject by various English writers. This one, by Hugh Wansey Bayly, is particularly excellent, treating the subject in a most concise and interesting manner. The chapter on the spinal fluid in relation to syphilis is most instructive and gives a fair résumé of the literature. Like most books by pathologists, a great deal of reliance is placed upon laboratory methods in controlling treatment. Such books as this one will gradually train the medical public to control and diagnose the treatment of syphilis by laboratory methods. From a modern scientific standpoint, it should be done in every case.

Syphilis is such a serious disease that all means should be used in individual cases to determine a cure. The laboratory has shown us that syphilis may be clinically well, yet the spinal syphilis may show that subtle, insidious changes are going on in the nervous system. We can sincerely urge the profession to read such books as the one under consideration.

THE ANATOMY OF THE HUMAN EYE AS ILLUSTRATED BY ENLARGED STEREOSCOPIC PHOTOGRAPHS. By Arthur Thomson, M. A., M. B., F. R. C. S., Professor of Human Anatomy in the University of Oxford. New York: Oxford University Press. 1912.

To illustrate a course of lectures on the gross anatomy of the eye delivered to candidates for the diploma in ophthalmology at Oxford, Mr. Arthur Thomson, Professor of Human Anatomy in the University, prepared a series of stereoscopic photographs of sections of the eyeball. The specimens, removed within four hours after death, were hardened in formalin, frozen and sections prepared. They were then placed in spirit and photographed.

It is really astonishing how vividly these wonderful photographs portray the gross anatomy of the eye. The specimens appear under moderate magnification, each structure standing out in its natural relation to all other structures. A study of these photographs will afford the observer a far better understanding of the gross anatomy of the eye than any amount of printed description. Descriptive chapters accompany the photographs. Each photograph is accompanied by an outline sketch indicating the special features to be observed.

Every student of ophthalmology should possess himself of this unique aid to the study of the anatomy of the human eye.

HANDBOOK OF DISEASES OF THE RECTUM. By Louis J. Hirschman, M. D., Fellow American Proctologic Society; Lecturer on Rectal Surgery and Clinical Professor of Proctology, Detroit College of Medicine, etc. etc. With One Hundred and Seventy-two Illustrations, Mostly Original, Including Four Colored Plates. Second Edition, Revised and Rewritten. St. Louis: C. V. Mosby Company. 1913. Price, \$4.00.

This, the second edition of Hirschman's "Handbook" represents a thorough revision of the former edition, both as regards text and illustrations. The book is intended primarily for the use of general practitioners and as such meets a very specific need.

The subjects treated are: A general consideration of the anatomy and pathology of the rectum, constipation, impaction, pruritus ani, fissure, abscess, fistula, hemorrhoids, polypi, proctitis, dysentery, prolapse, local anesthesia, and the clinical microscopy of feces examination.

Each subject is handled clearly and the operative details are remarkably well outlined with the aid of clear-cut illustrations that tend to make the volume an excellent example of good book making.

BRAIN AND SPINAL CORD. A Manual for the Study of the Morphology and Fibre-Tracts of the Central Nervous System. By Dr. med. Emil Villiger, Privatdozent in Neurology and Neuropathology in the University of Basel. Translated by George A. Piersol, M. D., Sc. D., Professor of Anatomy in the University of Pennsylvania. From the Third German Edition with 232 Illustrations. Philadelphia: J. B. Lippincott Company. 1912. Price, \$4.00.

Neurologists and anatomists owe a debt of gratitude to the translator of this book, Prof. Piersol. It is a very satisfactory, small anatomy of the central nervous system, based upon the most recent methods of investigation. The descriptions are admirable; they are brief and complete. The illustrations are, naturally, somewhat diagrammatic, but they pretend to be nothing more than guides helpful for the orientation of the reader.

This book would make an excellent aid to the student in his study of clinical neurology and should be recommended especially for a purpose such as this.

Part III. is devoted to serial sections through the brain-stem of a four-year-old-child, and affords a ready means of studying the course and direction of the important fiber tracts.

This book is unhesitatingly recommended both to students as a textbook and for neurologists who wish to keep their knowledge of the anatomy of the central nervous system up to the standard which careful clinical work demands.

HANDBUCH DER SEXUALWISSENSCHAFTEN. Mit besonderer Beruecksichtigung der kulturgeschichtlichen Beziehungen. Herausgegeben von Dr. Albert Moll in Berlin. Mit 418 Abbildungen und 11 Tafeln. Leipzig: Verlag von F. C. W. Vogel. 1912. Price, 28 m.

This work comprises a large number of essays written by recognized authorities in their special field, who thoroughly cover the large subject of sexual life in all its various aspects. It would be impossible even to outline here the contents of this volume, but some idea can be gained of its truly immense scope from the enumeration of some of its chapters and their authors: Biology and Morphology by Weissenberg; Psychology of Normal Sexual Desire by Havelock Ellis; Sexuality in Anthropology by Buchan; Social Forms of Sexual Relations; Erotic in Art and Literature, Culture and Sexuality by Moll; Functional Disturbances by Ellis and Moll; Sexual Diseases by Zieler; Sexual Hygiene by Moll; Sexual Ethics, Sexual Education, etc. by Ribbing, and finally two more chapters by Moll on Statistics Concerning Female Physicians and Police Regulation for Prostitutes in Berlin.

The work will be welcome to anybody who seeks true and reliable information, and should be kept from those who feel shocked when they find offensive facts truthfully stated.

THE SURGICAL CLINICS OF JOHN B. MURPHY, M. D., AT MERCY HOSPITAL, CHICAGO. February, 1913. Philadelphia: W. B. Saunders Company. 1913. Price, \$8.00 per year.

This volume of the clinics of Murphy, is, like all those that have preceded it, instructive and refreshing; instructive, in that there is a broad range of surgical teaching between the covers, and refreshing in that the point of view is so strongly personal. This personal note sometimes approaches dangerously near the border-line of dogma; but Murphy's words speak conviction so plainly that one may hardly take exception to a bit of dogma now and then.

The volume contains a lecture on the Open Treatment of Fractures by Mr. Arbuthnot Lane, and one on The Medical Relations of Physician and Patient by Dr. W. C. Woodward, in addition to Murphy's clinics on Osteitis of the Femur, Luxation of the Semilunar Cartilages, Fecal Fistula, Tuberculosis of the Knee, Paget's Disease, Acute Appendicitis, Abscess of the Neck, Pyosalpinx, Cerebral Adhesions, Fracture of the Humerus, Laminectomy, Pyloric Stenosis and Hour-Glass Stomach.

MONOGRAPHIEN UEBER DIE ZEUGUNG BEIM MENSCHEN. Von Dr. Med. Hermann Rohleder, Sexualarzt in Leipzig. Band II. Die Zeugung unter Blutsverwandten. Leipzig: Verlag Von Georg Thieme. 1912. Price, M. 4.20.

But few are as competent as Rohleder to write on any subject relating to sexual life. His latest contribution consists in a series of monographs dealing with the reproductive process of the human being. This second volume of the series deals with the problem of reproduction among blood relations. In order to present the subject clearly, and more fully than has ever been attempted before, the writer begins his most interesting volume with a consideration of

consanguinity and its result in plant and animal life and in man, especially in view of our latest knowledge of sexual biology. To make himself clear he devotes several chapters to phenomena and natural laws which tend to counteract incest and also speaks in detail of degeneration and regeneration in general. He gives an exposé of the influence of intermarriage on the development and decline of older races and refers to the existence of intermarriage to-day in certain races and small communities. He concludes the volume with a critical review of all existing laws against incest.

As stated above this is the most exhaustive study of the subject ever published and undoubtedly forms one of the most valuable recent contributions to sex literature.

ON GASTROSCOPY. With a Description of a New, Easy and Efficient Method of Esophago-Gastroscopy, Combining Direct and Indirect Vision; and a Plea for Its Employment by Gastric Experts. By William Hill, B. Sc., M. D. Lond., Surgeon for Diseases of the Throat, Nose and Ear, St. Mary's Hospital, Lond., etc. etc. (With 47 Illustrations.) London: John Bale, Sons and Danielsson, Ltd. 1912. Price, 3s, 6d.

In this little monograph the author, after presenting a brief historical review of the subject of gastroscopy with a description of the various instruments devised for the purpose, enters into a description of his own gastroscope. This instrument for the first time combines the principles of direct and indirect vision. An outer tube, built on the plan of the Killian instrument is first passed into the stomach under direct vision. When in place, an indirect vision periscope is passed through the outer tube and the air-inflated stomach may be inspected. The author records his own, as yet rather brief, experience with the instrument. The illustrations are numerous and well chosen.

Those interested in gastroscopy cannot well neglect this contribution to the subject.

DER KOHLEHYDRATSTOFFWECHSEL UND DIE INNERE SEKRETION. Darlegung ihrer beiderseitigen Beziehungen und neue Erklärung des Wesens hiermit zusammenhängender Stoffwechselkrankheiten. Für Forscher und Praktiker. Von Dr. Paul Hoeckendorf, Spezialarzt für Stoffwechselkrankheiten, Berlin-Charlottenburg. Berlin: Verlag von August Hirschwald. 1912.

No subject in medicine occupies more attention both in theory and in practice than does carbohydrate metabolism in its multiform relations to the ductless glands. Likewise no subject is more involved. The present volume presents an interesting theoretical discussion in a style which is none too easy to follow. The difficulty of getting facts to support the numerous theories one meets in attempting to unravel the mysteries of 'sugar disease' makes it rather difficult critically to review such a volume. The book may become a classic, and again it may not; and that is about all one can truthfully say of it.

A TEXT-BOOK OF OBSTETRICS. By Barton Cooke Hirst, M. D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Howard, the Orthopaedic, and The Philadelphia Hospitals, etc. Seventh Edition, Revised and Enlarged with 895 Illustrations, 53 of them in Colors. Philadelphia: W. B. Saunders. 1912. Price: Cloth, \$5.00; Half-Morocco, \$6.50.

This new edition shows some noteworthy changes the most important of which is the consideration of the normal physiological process of generation before anomalies are discussed. We feel that this change alone will greatly enhance the value of this work as a textbook for the student, who can hardly be expected to appreciate the pathology of pregnancy or labor before he has had an opportunity to familiarize himself with the normal process of generation.

The volume reflects all the most recent contributions in obstetric literature.

A TEXT-BOOK OF PHYSIOLOGY: FOR MEDICAL STUDENTS AND PHYSICIANS. By William H. Howell, Ph. D., M. D., LL. D., Professor of Physiology, Johns Hopkins University, Baltimore. Fourth Edition, Revised. Octavo of 1018 pages, fully illustrated. Philadelphia and London: W. B. Saunders Company. 1911. Price: Cloth, \$4.00; Half-Morocco, \$5.50.

A new edition of this work, which has become a standard textbook, must be welcomed by students and practitioners alike. The author has attempted to include in the present edition those recent advances in the science which seem of fundamental import. Only in this way is it possible to keep within the necessary bounds of space dictated by practical utility.

GOLDEN RULES OF SURGERY. Especially Intended for Students, General Practitioners, and Beginners in Surgery. By Augustus Charles Bernays, A. M., M. D. Hdldg., M. C. R. S. Eng. Life Member of the German Society for Surgeons of Berlin, etc. etc. Second Edition, Revised and Rewritten by William Thomas Coughlin, M. D., Assistant Professor of Surgery, Chief of Clinic, St. Louis University Medical School, St. Louis, Mo. St. Louis: C. V. Mosby Company. 1913. Price, \$2.25.

For those who were close associates of the late Dr. Bernays, it must be a source of gratification to see this small volume enter its second edition, for the terse epigrammatic style represents the very embodiment of Bernays himself.

The annotations by the editor, Dr. W. T. Coughlin, adds value to the work, without in any way detracting from the charm of a vivid personality as represented by the volume.

We can strongly recommend the work to students, as well as to general and surgical practitioners.

A PRACTICAL TEXTBOOK OF THE DISEASES OF WOMEN. By Arthur H. N. Lewers, M. D. Lond., F. R. C. P. Lond., Senior Obstetric Physician to the London Hospital; Examiner in Midwifery and Diseases of Women at the Conjoint Board of the Royal College of Surgeons of England, etc. etc. Seventh Edition. With 258 Illustrations, Thirteen Colored Plates, Five Plates in Black and White, and a Large Number of Illustrative Cases. New York: Paul B. Hoeber. 1912. Price, \$4.00.

Only a teacher of extensive practical experience is able to produce a textbook of comparatively small size, which presents not only all the essential facts but a wealth of important details, in so clear a manner. Possibly the most characteristic feature of this work is a series of well-selected and well-worded case histories illustrating vividly the symptomatology and clinical course of the anomaly under discussion. Such histories undoubtedly relieve the monotony incidental to systematic enumeration and description of symptoms, and this may explain the evident popularity of this book with the student, a fact which has necessitated the appearance of seven editions in a comparatively short time.

DAS WEIB IN DER NATUR- UND VOELKERKUNDE. Anthropologische Studien. Von Dr. Heinrich Ploss und Dr. Max Bartels. Zehnte, stark vermehrte Auflage. Neu bearbeitet und herausgegeben von Dr. Paul Bartels. I. Lieferung. Vollstaendig in 19 Lieferungen. Leipzig: Th. Grieben's Verlag (L. Fernau). 1912. Gesamtpreis 30 m.

This is one of the classics of German literature. When in 1884—almost thirty years ago—Ploss published his volume "Woman in Anthropology," the literature of the world contained but few contributions to this question, which to-day ranks among the most popular ones. Ploss' work has survived as one of the fittest in the competition. First with the help of Max Bartels and now under the editorship of Paul Bartels, this work has been regularly republished, always enlarged and improved to reflect the latest advances, until to-day, in its tenth edition, it probably remains the most scholarly treatise on feminology—to use the very latest term.

PRIVATE DUTY NURSING. By Katharine DeWitt, R. N., Graduate of Mount Holyoke Seminary and of the Illinois Training School for Nurses, etc. etc. Philadelphia and London: J. B. Lippincott Company. 1913. Price, \$1.50.

This very excellent little volume has to do with private duty nursing in the home, as distinguished from private duty nursing in institutions. The style is pleasing and simple, and is well used to clothe practical information. In most pleasing and tactful fashion the authoress points out the proper relationships between nurse and family, patient, guests, servants and doctor. Special chapters are devoted to obstetrics, contagious diseases, the training of babies, and to nursing en route, and in hotels.

OBSTETRICS. A Text-Book for the Use of Students and Practitioners. By J. Whitridge Williams, Professor of Obstetrics, Johns Hopkins University; Obstetrician-in-Chief to the Johns Hopkins Hospital; etc. etc. Third Enlarged and Revised Edition. With Sixteen Plates and Six Hundred and Sixty-eight Illustrations in the Text. New York: D. Appleton and Company. 1912.

Williams' "Obstetrics" does not call for a detailed consideration of its scope or contents. It is too well known to the entire profession. May it suffice to state that it has appeared in a third, thoroughly revised edition which reflects the latest approved results of scientific investigation in the field of obstetrics.

THE PRACTICE OF OBSTETRICS. Designed for the Use of Students and Practitioners of Medicine. By J. Clifton Edgar, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College; Visiting Obstetrician to Bellevue Hospital, New York City, etc. etc. Fourth Edition, Revised. With 1316 Illustrations, Including Five Colored Plates and 36 Figures Printed in Colors. Philadelphia: P. Blakiston's Son and Company. 1912. Price, \$6.00.

In this new edition many chapters have been rewritten and brought up to date. New material has been added, notably concerning blood-pressure, anesthesia during labor, vaccine and serum treatment of sepsis, hemorrhage in the newborn, pelvimetry of the pelvic outlet and many other questions discussed widely in most recent obstetric literature. A textbook, which bears on its title page the information that twenty-two thousand copies have been issued, indicates its popularity as a work of practical value.

A TEXT-BOOK UPON THE PATHOGENIC BACTERIA AND PROTOZOA FOR STUDENTS OF MEDICINE AND PHYSICIANS. By Joseph McFarland, M. D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College, Philadelphia; Professor of Pathology in the Woman's Medical College, etc. etc. With 293 Illustrations, a number of them in Colors. Seventh Edition, Thoroughly Revised. Philadelphia: W. B. Saunders Company. 1912. Price, \$3.50.

In the present edition of this well-known textbook the scope of the work has been considerably altered, including for the first time the protozoa and their significance in the various pathological processes. The technique of the Wassermann reaction and the Noguchi modification is described, together with directions for preparing the various reagents. The recent work on the parasitic ameba receives due consideration, likewise the work on prophylactic vaccination against typhoid. The book is lavishly illustrated.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., Professor of Therapeutics and Diagnosis in the Jefferson Medical College of Philadelphia, etc. Assisted by Leighton F. Appleman, M. D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia, etc. Volume IV, December, 1912. Philadelphia: Lea and Febiger. 1912. Price, \$6.00 per annum.

This number contains the following monographs: Diseases of the Digestive Tract and Allied Organs by Edward H. Goodman; Diseases of the Kidneys by John Rose Bradford; Genito-Urinary Diseases by Charles W. Bonney; Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures and Dislocations and Tumors by Joseph C. Bloodgood; Practical Therapeutics Referendum by H. R. M. Landis. The volume closes with a general index.

DIET AND HYGIENE IN DISEASES OF THE SKIN. By L. Duncan Bulkley, A. M., M. D., Physician to the New York Skin and Cancer Hospital, etc. etc. New York: Paul B. Hoeber. 1913. Price, \$2.00.

This book consists of six lectures delivered at the New York Skin and Cancer Hospital, which reflect the personal experience of the lecturer.

Dr. Bulkley has enjoyed a long medical career and has been one of the most prolific writers in this country upon dermatological subjects. He has always been a student of general medicine, which fact has largely influenced his writings. The book should be of great assistance to those interested in the subject of the importance of diet and hygiene as adjuvants in the treatment of skin diseases.

DISEASES OF THE EYES. By C. Devereux Marshall, F. R. C. S., Surgeon to the Royal London (Moorfields) Ophthalmic Hospital and Ophthalmic Surgeon to the Victoria Hospital for Children, Chelsea. Fully Illustrated. New York and London: Oxford University Press. 1912. Price, \$3.75.

The volume under review is one of the useful London Medical Publications. As the preface states it is "chiefly designed for the use of students and those practitioners who, while doing a certain amount of work, cannot be considered as experts." The book is a good representative of its class. The personal views of the author are pretty strongly emphasized, such dogmatism being not only excusable, but even desirable in order to avoid confusing the reader with conflicting theories. In the final chapter a fairly comprehensive list is given of the visual requirements of the public service.

MANUAL OF MEDICINE. By A. S. Woodward, M. D., M. R. C. P., Junior Curator of St. Bartholomew's Hospital Museum; Physician to the Royal Waterloo Hospital and the Miller General Hospital for South-East London, etc. etc. New York: Oxford University Press. 1912.

This little manual was written for the twofold purpose of supplying ready information for students in the wards and out-patient departments and, at the same time, as an appeal to the busy practitioner. The one thing that commends this book is the ease with which one can find any subject considered within its pages, which is due to a simple alphabetical classification of all diseases, signs, symptoms, drugs, etc.

HANDBOOK OF PHYSIOLOGY. By W. D. Halliburton, M. D., LL. D., F. R. C. B., F. R. S., Professor of Physiology, King's College, London. Tenth Edition (being the Twenty-third Edition of Kirkes' Physiology). With nearly six hundred illustrations in the text, many of which are colored, and three colored plates. Philadelphia: P. Blakiston's Son and Co. 1911. Price, \$3.00.

This textbook is too well known to need comment. The present edition has been thoroughly revised, and the more recent advances in the science of physiology, such as the knowledge obtained in the studies with the string-galvanometer, are included. The work is profusely illustrated.

A COMPEND OF HISTOLOGY. By Henry Erdmann Radasch, M. Sc., M. D., Assistant Professor of Histology and Embryology in The Jefferson Medical College. Third Edition, Revised and Enlarged. With 111 Illustrations. Philadelphia: P. Blakiston's Son and Company. 1912. Price, \$1.25.

This little volume is a typical compend of the better class, rather more complete than most. In the second edition, the sections dealing with the circulation, nervous system, and the teeth were much improved, and in the third edition the author has apparently contented himself with minor changes.

The present reviewer is not in favor of quiz-compends, but is compelled to say that this book is one of the best of its kind.

DER JETZIGE STAND DER KREBSFORSCHUNG. Von Prof. Dr. Georg Klemperer, Direktor des Instituts fuer Krebsforschung der Koenigl. Charité und des Staedt. Krankenhauses Moabit. Referat, erstattet in der Generalversammlung des Deutschen Zentralkomitees fuer Krebsforschung am 18. Mai 1912. Berlin: Verlag von August Hirschwald. 1912.

This little referat contains an excellent review of the subject which can be read with profit by anyone interested. Such reviews handled in such a careful critical way fill a decided need in medical literature. Two or three typographical errors creep in, but they can well be overlooked in the general excellence of the volume.

STUDIES IN CARDIAC PATHOLOGY. By George W. Norris, M. D., Associate in Medicine at the University of Pennsylvania. Large Octavo of 233 pages with 85 original illustrations. Philadelphia and London: W. B. Saunders Company. 1911. Cloth, \$5.00.

The work consists of excellent photographic reproductions of museum specimens illustrating the various examples of cardiac pathology. The text is a running criticism and explanation of the cuts with a brief statement of the pathological anatomy, references to the literature, and pertinent statistic data.

DIE BEDEUTUNG DER VERERBUNGSLEHRE FUEER DIE AUGENHEILKUNDE. Rueckblicke und Ausblicke. Von Prof. A. Peters in Rostock. Halle a. S.: Carl Marhold. 1911.

This small monograph of 30 pages deals in a brief manner with some ophthalmic problems on which the study of heredity throws light. Special mention is made to painstaking researches of Nettleship of the family trees of some types of congenital cataract. The author emphasizes the desirability of similar studies in other types of ocular disease.

LEPROSY AND ITS TREATMENT. By Pandit Kriparam Sarma. Third Edition. Howrah, India: Published by the Author. 1911.

A curious and unique volume, slightly marred by a braggadocio style of writing, perhaps attributable to the oriental imagination, but withal worth while. The volume recites a series of cases treated by the author who claims a cure. The book contains some useful information regarding leprosy.

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EDITORIAL.

THE RÔLE OF WOMAN.

Latterly, a number of medical journals in this country have expressed their thoughts on the subject of the rôle of woman, and though one would expect just a slight degree of modernity, for some reason, which can be explained on no other grounds than fear of wounding the sensibilities of the oldest subscriber, the 'leaders,' as well as the papers, confined themselves peacefully to the contemplation of woman as mother and caretaker of the household. This attitude on the part of the writers should come in for a degree of praise, perhaps not of the unstinted sort but of that kind which we bestow quite ungrudgingly on all human beings who do not ruffle our nerves. And surely the mild lucubrations which it was our lot to read might have been written some decades ago, or—and here we are perhaps betraying some of the secrets of the editorial office—were some old material gathered from the dust-heap of long-forgotten journals and refurbished for the occasion. But despite the gentle advice that all women should follow in the footsteps of their foremothers, and that if they did not do this they would not only incur the wrath of present-day physicians, but be the wreckers of our commonwealth, we doubt if what all these mild rebukes hold is really of much importance, since here again is illustrated the peacock superiority of man in its worst form, ever ready to advise so that his purview will not be narrowed down to the strict following of his own profession. Of course, as physicians, we know that there are alas! too many women who refuse to undergo the torture of motherhood only once, and who are scatter-brained enough to imagine that their attitude is modern; but as physicians we also know that motherhood repeated too often has its dire results, for though it may never make physical wrecks of women, as some social reformers contend, it necessarily adds to the burdens of a

woman's life. And just because these burdens are quite difficult to carry for any one human being, quite difficult to encompass considering that a woman has only two hands and that even her day has but twenty-four hours, is it not foolhardy for us to continue to write twaddle that has all the earmarks of being warmed over from year to year? Far better, indeed, would it be to say outright that the bearing of children is not a joke, that the bringing up of children is a task that very few are capable of carrying to the ramparts of success, that though as physicians we deprecate the limiting of children in one family, we are aware, nevertheless, that each additional mouth needs food, and that human happiness is not founded on work that grinds, on cares that canker, on the reducing of any being to a mechanism that has for its existence here on earth only one object—namely, the bringing forth of children so that what we may deem its mission as a living entity can be fulfilled.

That the foregoing preachments of our medical writers show them to be of the class that would rather continue to think the thoughts of yesterday than be disturbed by acquiring something new was brought home to the writer by reading "Problems of the Sexes"* by Jean Finot, "Rahel Varnhagen"** by Ellen Key, and Dr. Jean Camus' article on Mme. Dejerine-Klumpke in the *Paris Médical* of January 18th. Not that there is a great similarity between the two books, or between the article in the French journal and either one of the books, but there is this point of resemblance that the rôle of woman is not necessarily that of a child-producing quantity with no other thought but the increase of the population. And though it can be said without seeming captious of Ellen Key's undoubted talent as a writer that her book merely illustrates the possibilities of an intellectual woman widening her domain, and that, therefore, the lesson derived from its perusal is not applicable to all women, there is enough food for thought in her book not to neglect it altogether when we are deciding in our masculine way what really is the rôle of woman. But a much more important contribution to the subject is Finot's "Problems of the Sexes," for here we may read about "The Birth of the New Woman," and learn, moreover, that when an author is thoroughly unbiased his influence for doing good is far-reaching. As an Equalization Board of one Finot need fear comparison with no writer whom we know; and just because he recognizes two sexes and not the male sex and a sex which the male sex thinks it ought to be, he arrives at a wide-open plain and not in a chasm where his point of view might suffer obliquity from the narrowness of his outlook.

*G. P. Putnam's Sons, New York. 1913.

**G. P. Putnam's Sons, New York. 1913.

THE AMERICAN COLLEGE OF SURGEONS.

The meeting of the recent Congress of Physicians and Surgeons, held at Washington, D. C., during May, was preceded by a called meeting of some four hundred and fifty surgeons, for the purpose of establishing the American College of Surgeons. Beyond all reasonable doubt, the birth of this organization marks an epoch in American surgery, and it is well, therefore, to sketch, in broad lines, the purposes and hopes that inspire the founders of this newest brotherhood of surgeons.

At the meeting of the Clinical Congress of Surgeons of North America, in November, 1912, an organization committee, composed of twelve representative American surgeons, was appointed to canvass the field and invite five hundred American surgeons to interest themselves in the founding of the American College of Surgeons. Of the five hundred men invited, four hundred and fifty responded by attending the meeting held at Washington, May 5th, 1913. The call of this meeting, which summarizes the work of the organization committee, was as follows:—

“First, It should formulate a minimum standard of requirements which should be possessed by any authorized graduate in medicine, who is allowed to perform independently surgical operations in general surgery or any of its specialties.

“Second, It should consider the desirability of listing the names of those men who desire to practise surgery and who come under the authorized requirements.

“Third, It should seek the means of legalizing under national, colonial, state or provincial laws, a distinct degree supplementing the medical degree, which shall be conferred upon physicians possessing the requirements recognized by this law as necessary to be possessed by operating surgeons.

“Fourth, It should seek co-operation with the medical schools of the continent which have the right to confer the degree of M. D. under the present recognized standards, and urge these colleges to confer a supplementary degree on each of its graduates who have, in addition to their medical course, fulfilled the necessary apprenticeship in surgical hospitals, operative laboratories and actual operative surgery.

“Fifth, It should authorize and popularize the use of this title by men upon whom it is conferred, and its use should especially be urged in all directories of physicians in order that the laity as well as medical men can distinguish between the men who have been authorized to practise surgery, and those who have not.”

The net result of the Committee's efforts was that five hundred surgeons of all specialties, representing every large centre of population,

every important university city with a teaching faculty of medicine, every special and general society representing a specialty of surgery, all the important surgical clinics and hospitals, besides many independent surgeons from all parts of the North American continent consented to become founders of the organization under contemplation.

At the founders' meeting in Washington a set of temporary by-laws were drawn up, and many of the details of organization were considered and discussed tentatively. It suffices for our purposes now to emphasize only one point in this discussion—namely, the object of the establishment of the organization. This object is set down in the by-laws as follows:—

“The object of the College shall be to elevate the standard of surgery, to provide a method of granting fellowships in the organization and to formulate a plan which will indicate to the public and the profession that the surgeon possessing such a fellowship is especially qualified to practise surgery as a specialty.”

Of course, this merely means that the time has arrived when concerted action must be taken to protect the public seeking the services of highly specialized practitioners. It is, in one sense, an unfortunate fact that the laws of our country do not permit federal incorporation of a body such as the American College of Surgeons; it is even more unfortunate that state laws and a broad spirit of democracy militate against limiting the activities of men in accordance with the actual qualifications. On only one basis can the medical profession hope to limit the scope of specialism to specialists of established fitness. That basis is tradition. The founding of the American College of Surgeons is a step in the right direction, and if the founders and fellows will but realize that, at best, tradition is established only by slow grades, at an almost imperceptible pace, their hopes are certain to come to fruition. Their wisdom in making their society inclusive rather exclusive, in enlisting the support of all the allied surgical specialties, in attracting the men who now stand for the best in American surgery, and finally in securing as their managerial aid in organization, Franklin H. Martin—all this tokens success in a venture that means supremely much for American surgery in days to come.

OPINION AND CRITICISM.

A NATIONAL DEFECT.

If what Mr. Alfred W. McCann tells us in his recently published book* is true, then indeed we Americans are really of a low degree of intelligence to allow ourselves to be so easily duped. Or perhaps we are lazy and indifferent, or too greatly attracted by the meretricious, hence are 'taken in' by what glitters in the matter of food, though all along we may know that it is chemically prepared. That we as a nation are very careless about what goes into our stomachs has been commented on in various journals from time to time, and quite often with a degree of intensity that made the reader wince; but never before has the dire situation been brought out so forcibly as in this book of Mr. McCann's. Now, though to the reviewer every page of this book was of such moment that he read it carefully, he was nevertheless irritated by the author's point of view—namely, that the manufacturer was the arch villain and the people the innocent victims. Without going into the statistics, it can be said without any great infraction of the truth, that the American householder prefers tinned goods, so-called maraschino cherries, California fruit, tinned corn, peas and other vegetables, and 'bright-looking' steaks to other foods which require considerable care in the preparing. It is the custom of the country; and, since every country has its customs, why should we not have one that stamps us indubitably as Americans? Hence, the inference must be that if there was no demand for candies 'all dressed up,' for 'red' chops and steaks, for California fruit that is made to look so luscious that Nature must smile if she has any sense of humor, for polished rice, for French peas which no Frenchman would touch, there would be fewer manufactured articles and the manufacturer would not increase his riches at such a merry clip. Moreover, if the demand for tinned goods were limited to the poor who live in tenements and whose cook stove, if there is one, is a voracious eater of coal that must be paid for, we would hardly call the habit of buying tinned goods the custom of the country; but when one remembers that every household in this free country is more or less guilty of the act, it is no exaggeration to declare that one of our most characteristic insignia is the buying of food for the table which does not exact any painstaking work on our part to make it eatable. Just so soon as we get over the idea that education can be 'ready made,' that an aristocracy can be 'ready made,' that a fortune is 'ready made' if we will but look around for it, that clothing 'ready made' is a

*Starving America. New York: George H. Doran Company. 1913.

gift from the manufacturer whose benevolence extends to the overpaying of his hundreds, if not thousands, of employees, just so soon will we realize that we are a very lazy people who have the most infantile notions of what should constitute one's manner of living. In the meanwhile, let us all read Mr. McCann's book and realize what enemies we are to an organ which, though not so refined as the heart, since it plays no part in the sentimental phase of one's life, is nevertheless of the greatest value, in its proper workings, for the up-keep of the human economy.

LITERARY NOTES.

There have been all sorts of cookery books published in the past and no doubt the future output will be just as plentiful. We have been told by the Germans how they prepare their favorite dishes, by the French the Lucullan delights of Gallic sauces, by the English the lure of pork pie and suet pudding, and by the Scotch the beatific qualities of haggis; but, were we to write historically on the subject of the number of cookery books that have been published in any language with the full titles of the books and the date of their publication, great would be our ignorance. If this long felt want of knowing the evolution of works on the culinary art in any language has been a drawback in the past to a proper performance of a chronological account in the shape of an essay, we need not continue to bemoan the lack, for, as regards a chronological list of English cookery books, much may be learned from Dr. Arnold Whitaker Oxford's "English Cookery Books to the Year 1850" (Oxford University Press, New York). That this book must be interesting even to those who are not deeply engrossed in the mysteries of what issues from the kitchen can be stated without reservation, for the quaintness of the titles and the aptness of the author's notes make the sort of reading that is not found in the general run of books. Readers, who are accustomed to the prosaic titles of modern cookery books, which run thus: How to Prepare Roasts, The Chafing Dish in the Modern Home, Native and Foreign Dishes, etc., should turn to the pages of Dr. Oxford's interesting compilation and learn what authors in former ages thought right and proper in the make-up of a title. For instance, on page 32 we read that in 1664 Hannah Wolley wrote "The Cooks Guide: or, Rare Receipts for Cookery. Published and set forth particularly for Ladies and Gentlewomen; being very beneficial for all those that desire the true way of dressing of all sorts of Flesh, Fowles, and Fish; the best Directions for all manner of Kickshaws, and the most Ho-good Sawces: Whereby Noble Persons and others in their Hospitalities may be gratified in their Gusto's," and on page 73 that in 1743 was published the following book: "A Present for a Servant-Maid, or The Sure Means of gaining Love and Esteem. Under

the following Heads: Observance, Avoiding Sloth, Sluttishness, Staying on Errands, Telling Family Affairs, Secrets among Fellow-Servants, Entering into their Quarrels, Tale-bearing, Being an Eye-Servant, Carelessness of Children, Of Fire, Candle, Thieves, New Acquaintance, Fortune-Tellers, Giving Saucy Answers, Liquorishness, Apeing the Fashion, Dishonesty, The Market-Penny, Delaying to give Change, Giving away Victuals, Bringing in Chair-women, Washing Victuals, Quarrels with Fellow-Servants, Behaviour to the Sick, Hearing Things against a Master or Mistress, Being too free with Men-Servants, Conduct towards Apprentices, Mispending Time, Publick Shews, Vails, Giving Advice too freely, Chastity, Temptations from the Master, If a Single Man, If a Married Man, If From the Master's Son, If from Gentlemen Lodgers. To which are added Directions for going to Market; Also, For Dressing any Common Dish, whether Flesh, Fish or Fowl.

When we think how misleading our titles are, especially to cookery books, not only on account of their brevity but also on account of announcing to the public that that which follows is so simple that it can be learned in a few lessons, that no cook no matter of what low degree can fail to achieve success, only to find that the most complicated receipts are given, we see how much more truthful our ancestors were in the matter of letting the public know, *via* the title, what really was the contents of a book on cooking.

If there are any medical men who are a bit tired of the usual in fiction—the sort of plot that has been overworked until it is threadbare or those wearisome diatribes against civic corruption which it would seem are the favorite staple of the American novelist—let him turn to Mr. Oliver Onions' "In Accordance With the Evidence" (George H. Doran Company, New York) and learn how profit can be derived even from reading the lighter forms of literature. Here is a book that is written with earnestness, sincerity, and also with a purpose; and, though the present reviewer is not too much enamored of novels with a purpose, in this instance the purpose is not to reform a defect in our sociology, but to describe the growth of an idea in the rather barren soil of a narrow life until it accomplishes its end—namely, the murder of a weakling whose life is easily outweighed, as regards importance, by that of the man who commits the deed. Whether or not the reader agrees with the author that the crime was justified, he cannot but admire the character of the hero—his struggle to get on, his strength of purpose, his disgust of the other man, and finally his philosophical summing up of the worthlessness of his victim's life. All this is described with a literary sobriety that speaks much for the talent of the author, and indicates, moreover, how good an effect may be achieved by the absence of unnecessary words. Very few novelists before the public to-day seem to be aware of this; hence, if we

desire to read them, it devolves on us to plough through a maze of words which may be good space fillers, but which not only exasperate the reader but weaken the story. Mr. Oliver Onions has a standard of writing that is his own; and aside from the simple plot of this novel, its minute descriptions of character study, its undeviating and logical sequences, it ranks high because of its literary simplicity, its absence of affectedness, and the dramatic heights it reaches through no ostentatious spirit of the author.

One would think that by now all that could have been written on the subject of the Little Corporal had wellnigh reached its limit, but such is the perennial interest manifested in this extraordinary man that only a few months are allowed to elapse before another book appears to give us, if not something new, at least a new viewpoint so that a clearer understanding of the man may be ours. Were we asked to describe succinctly Dr. A. Rose's "Napoleon's Campaign in Russia Anno 1812" (The Author, 173 Lexington Ave., New York) we would say that here is a literary version of the Vereshchagin pictures, for nearly every page of this book attests to the grinness, the tragic and despairing note that were the salient features of the overtowering ambition of a superman to invade and conquer a country that is nigh impregnable, especially in winter. Napoleon had nothing lacking as a military genius, but like all great men he did lack judgment on certain occasions; and never was this more apparent than when his unquenchable desire for further glory drove him into the undertaking of an invasion of Russia. All the horrors of the campaign are told by Dr. Rose in a manner that bespeaks the admiration of the reader, and without any attempt to exaggerate the dramatic side of the story. A straightforward narrative it is, and one that has the additional value of having been written by a medical man who combines perspicacity with a literary style that is most commendable.

It is not often that there comes from the pen of a medical man in this country so satisfying a volume of essays as are those of Dr. Roswell Park which are included in his book "The Evil Eye, Thanatology and Other Essays" (Richard G. Badger, Boston). When we write 'satisfying' we mean that the volume is not too learned, not too verbose, and not too crammed with anecdotes so as to crowd out the author's original thought. All is told in very good English that seems to flow gracefully from the author's pen and is never of the 'reportorial' sort that indicates haste and no consideration for the reader's finer sensibilities. But aside from a style that is above the average, the contents of each essay must give the intelligent reader pause, for at once he is inducted into erudition of the pleasanter sort and is told of incidents in history that are seldom grouped

together by so facile a pen. Only too often, with the medical essayist, the desire to tell the reader all that he knows of a subject leads him into the deplorable habit of overcrowding his pages with a very jumble of bits of history that are as badly put together as second-rate literary carpentry is capable of. Thus, indeed, it is a relief to browse on the pages of this very interesting book which, besides the foregoing good points, has the additional one of variety. Dr. Park seems to the reviewer at his best in his essay on "Giordano Bruno," that is in his more serious mood, and in "Student Life" in his lighter mood. But this is only a preference that may be peculiar to the reviewer and should not be taken as a final verdict by any reader, for in reading books that interest us no two readers are of the same opinion as regards outstanding chapters. And it is well that this should be so, especially in the case of a book as rich in food for thought as is this one; hence, even if our judgment is wrong, the reader will not be far amiss when he reads "The Evolution of the Surgeon from the Barber" and "The Career of the Army Surgeon," or that *tour de force* in medical essay writing—"A Study of Medical Words, Deeds and Men."

No doubt a goodly number of readers are deeply interested in the Balkan War and are following the vicissitudes of the Turks with a degree of attention that must be attributed to surprise that so powerful a nation as the Turks should to-day be humbled in the dust by a number of small Powers. A novel that will give them a much better idea of the Turks and also of the political game that was played during the Crimean War than can be had by reading present-day criticism in the daily press is Richard Dehan's (Clotilde Graves) "Between Two Thieves" recently published by Frederick A. Stokes Company, New York. This is a big novel in the sense of a large canvas on which are drawn, in masterly fashion, Napoleon III, Tsar Nicholas I, Hector Dunoisse (Henri Dunant, the founder of the Red Cross Society), Ada Merling (Florence Nightingale), the Empress Eugénie, and many others. In fact, no better description of this eventful period in French history, when Napoleon and his consort were at the zenith of their power, can be found in any other historical novel or for that matter in any history, for the authoress has the gift of portraiture in a superlative degree and knows the French condition of mind as it was so well illustrated during the Second Empire. But though the medical reader will be held in the thrall of the chief historical incidents, what will interest him most will be that splendid specimen of courage and valor, Hector Dunoisse (Henri Dunant), and also Ada Merling (Florence Nightingale). The latter figures in the story to the extent to which any fair-minded historian would allow her, and all the nobility of her nature, as well as her persistency and self-sacrifice in the face of the greatest obstacles, is described by a sympathetic pen. A strik-

ing story, indeed, is this narrative dealing with the intrigues and machinations of the three participants in the Crimean War—England, France and Russia; but above the warring factions, above the roar of cannon, above the malodorous glitter of the Court of the Second Empire shine those two figures of light and leading—Henri Dunant and Florence Nightingale.

Whether or not there is enough interest to-day in the matter of the exact nature of the disease that killed Napoleon, is a question that must be decided by the reader's bias; and as far as the present reviewer is concerned his interest in the matter is decidedly lukewarm, since it has always seemed to him that whenever this painful subject is reopened party feeling runs high and acrimonious controversy results. Dr. Arnold Chaplin's recently published book "The Illness and Death of Napoleon Bonaparte" (Hirschfeld Brothers, London) is no exception to the rule which we have set down, for if we take but one criticism into consideration in substantiation of our contention—Dr. John Knott's article entitled "The Fatal Illness and Death of Napoleon the Great" in the February issue of the *Dublin Journal of Medical Science*, we will at once see that the old fires have been relit with the torch of acrimony. And it is all due to two diametrically opposite points of view—the English and Irish; and if it were not these, it may be added, it might just as well have been the diverging French and English standards, or the American and English. In a word, the right name for the disease that ended Napoleon's life depends on the point of view of the reader, for if he is a firm believer in Sir Hudson Lowe's veracity—and Dr. Chaplin is, since he founds his diagnosis on the "Lowe Papers"—he will agree with Sir Hudson and with the author; but if, on the other hand, he still recalls those inspired lines of Tom Moore which run thus: "Sir Hudson Lowe, Sir Hudson Lowe, By name and ah! by nature low," and pins his faith to O'Meara's testimony, he will agree with Dr. Knott that Dr. Chaplin's book is of second-rate importance. What boots it to-day whether "the chronic ulcer developing later into cancer" or "the hepatitis induced by the climate of St. Helena" undermined Napoleon's constitution the more, or whether Antommarchi and O'Meara were unreliable to the verge of destroyers of truth, as Dr. Chaplin makes them out, or whether we may trace the whole world o'er to find more truthful accounts than are contained in the "Lowe Papers"? For, no matter what disease caused Napoleon's death, we cannot forget that during his captivity Sir Hudson Lowe and his underlings were hovering over the greatest genius of modern times, with all their littlenesses, with all their irksome pettinesses.

ORIGINAL ARTICLES.

THE KINETIC THEORY OF SURGICAL SHOCK AND ANOCI-ASSOCIATION.

By GEO. W. CRILE, M. D., of Cleveland, Ohio.

Throughout medical and surgical history we find physicians and surgeons constantly baffled in their efforts to combat the condition which most often follows psychic or physical stress—the condition commonly called *shock*. The aged man dies suddenly on hearing of the death of an idolized son; the Marathon runner is overcome; the banker emerges a physical wreck after a season of financial panic; the patient succumbs after a major operation which in itself should not cause death; and in each case we say “he suffers” or “he died from shock.”

Many theories have been advanced to explain the phenomena of shock; cardiac, respiratory, hemorrhagic and vasomotor factors have been called to account for the condition. We have long known that disturbance of any part of the vasomotor mechanism might cause shock, but it remained for a long series of experiments in the laboratory and the continual observation of patients in the clinic to teach us that the vasomotor and other disturbances were intermediary between the cause and the effect. The key to the final cause of shock, whether caused by psychic strain and surgical stress was found in a study of the phylogenetic history, not of the vasomotor system alone, but of the whole motor mechanism.

We approached our goal by the aid of many sign-posts. First, we knew that the vasomotor system may recover its balance a few hours after the physical or psychic injury has been inflicted, while the ultimate restoration to health of all the bodily functions after shock may require weeks, months or often years.

Secondly, our researches and experimental studies soon convinced us of a primary and most far-reaching fact—namely, that the animals most capable of being shocked are those whose self-preservation is dependent upon some form of motor activity—the same animals are those in whom the presence of bodily danger is capable of producing the phenomenon of fear. And here it may be noted that the final result of intense fear is the same as that of physical exhaustion or that following psychic strain. In such animals the motor activity is excited by the adequate stimulation of the nerve receptors, both of the contact

ceptors in the skin and the distance ceptors—the special senses. Since the distance ceptors are as active as the contact ceptors in their warning of dangers to be avoided, we must assume that the stimulation of the former is as potent as is the stimulation of the latter.

As pain is produced by those causes only, whose evil effects may be mitigated or overcome by this or that form of muscular activity, so in surgical operations it is known that shock follows only operations upon those parts of the body which in our phylogenetic history have been subjected to injury by the dangers of environment. For example, injury of the brain or of the lungs, parts normally well protected and little liable to injury from enemies, is not followed by the characteristic shock phenomena. As injury of the heart, the brain, and the lungs led to immediate fatal results, there was no opportunity for the evolution of a protective motor mechanism. These parts, of necessity, were placed under special structural protection. We are forced, therefore, in this study to bear constantly in mind that the motor activity of the present, with all its accompanying manifestations of increased motion, fear and exhaustion, is the resultant of the continual adaptation to environment in our phylogenetic forbears.

As already indicated, we have long known that chloroform and ether anesthesia, while they prevent the conscious appreciation of pain, do not prevent other afferent traumatic impulses from affecting the vasomotor, the cardiac, and the respiratory centres. In the very course of the operation itself the effect upon these centres is manifested by increased pulse and respiration, and by the rigidity of muscular structures. These vasomotor and respiratory manifestations are found also in conscious persons threatened by physical injury. The only difference between the unconscious traumatized person and the conscious is that the former is deprived of the power of muscular action and does not see the threatened attack.

It is a physical law that no energy can be lost, and every adequate stimulus must, therefore, receive its adequate response. In an unconscious patient and in a conscious person alike the stimuli which are too powerful to be adequately met by defensive and offensive action, or slight stimuli repeated with too great frequency, must meet their response at the expense of damage to some part of the bodily mechanism.

Where then shall we look for the part which is exhausted under the strain of too great stimulation? Since we find that those animals which suffer most from shock are those with the most highly developed power of associative memory, we should expect to find the greatest ultimate damage in the centre of the mechanism for this faculty. In such animals, therefore, the nerve cells of the cortex must have borne the damage. This damage may be sufficient to break down the cells at once and we have a general exhaustion; or the cells may have become so overcharged that slight additional stimuli will be sufficient to overbalance them and we see the postoperative drain of 'nervous symptoms.'

Our researches proved this reasoning. The cells in the cortex of animals exhausted by fright or by prolonged physical trauma showed like changes, and these morphological changes varied from slight alterations in the cell content to complete deterioration.

As a result of this reasoning and of these researches, the writer formulated what he calls his 'Kinetic Theory of Surgical Shock.' This theory assumes (1) that the environment of the past (phylogeny) through adaptation predetermines the environmental reactions of the present; (2) that in each individual at a given time there is a limited amount of potential energy stored in each brain cell, that is, that the cell contents under stimulation are capable of a certain amount of chemical change, which will produce a relative amount of action—kinetic energy; (3) that the motor activity following each stimulus—traumatic or psychic—diminished in some degree the amount of potential energy in the brain cells, that is, by some chemical change of the cell contents a certain amount of kinetic energy is produced; (4) that when the motor activity resulting from the change of the potential energy in the brain cell to kinetic energy takes the form of obvious work performed, the phenomena expressing the depletion of the vital force are termed physical exhaustion; (5) that traumatic stimuli of sufficient number and intensity lead inevitably to exhaustion and death; (6) that when the expenditure of energy caused by emotional stimuli cannot take its normal course and produce motor activity, the condition reacts upon the cell itself. The stimulation is thus automatically increased and the resultant expenditure of potential energy is proportionately active. The final condition in either of the last two instances is designated *shock*.

If our kinetic theory is correct—namely, if fear and trauma produce like effects upon brain cells, then, since unconsciousness of threatened danger would assuredly prevent fear, why does not unconsciousness of the trauma inflicted in an operation prevent damage to the brain cells? That is, *why is not the administration of an inhalation anesthetic a sufficient preventive of shock?*

In the case of fear of a threatened danger, distance ceptors alone are concerned; in the case of actual physical trauma, contact ceptors come into play, and their path to the brain is not interrupted by the inhalation anesthetic. The patient is unconscious of the injury inflicted, but the brain cells reached by the nerve impulses from the seat of damage register the injury in cell changes. That the whole brain is not asleep is made evident often in the course of the operation itself by a marked increase in the respiratory rate and by an alteration in the blood-pressure. In fact, in serious operations one may see every grade of response to the injury, from the slightest changes in the respiration to a vigorous defensive struggle. As to the purpose of these subconscious movements there can be no doubt—they are efforts to escape from injury.

The resulting exhaustion after a prolonged operation is the same as

that following too prolonged muscular exertion or too great psychic strain. In our experiments upon animals we found, by examination of the brain cells after trauma inflicted under an inhalation anesthetic, that the morphological changes were the same as those seen after physical exertion or after fright. So in shock from injury, in exhaustion from overwork, in exhaustion from fear, and in collapse after a prolonged surgical operation, the impairment of function is the same—in each case morphological changes in the brain cells are produced, and in each a certain length of time is required to effect recovery.

Since the change of the potential energy of the brain cells into kinetic energy is due to the chemical alteration produced by oxidation of the cell contents, we should then search for the general anesthetic which would present the most interference to the use of oxygen by the brain cells. Testing this point experimentally, we found that the cell changes were approximately three times as great under ether anesthesia as under nitrous oxide anesthesia; that the fall in blood-pressure was, on the average, two and a half times less under nitrous oxide than under ether; and, finally, that the general condition was correspondingly better after the use of nitrous oxide than after ether. In the course of operations upon the human body this same protective effect of nitrous oxide has been repeatedly observed. It would seem, therefore, that nitrous oxide should be the anesthetic of choice.

But nitrous oxide, although to some extent it protects the brain cells by interfering with their chemical change, does not prevent damage by the traumatic impulses from the seat of injury. How can this danger be averted? Experiments upon a 'spinal dog' pointed the way to this final achievement of the shockless operation. A spinal dog is one whose spinal cord has been divided at the level of the first dorsal segment. Such a dog, if kept in good condition for two months or more, will show a recovery of the spinal reflexes, such as the 'scratch reflex.' Obviously in such an animal the hind extremities and the abdominal viscera have no direct nerve connection with the brain. We experimented upon a 'spinal dog' and found that a continuous severe trauma of the abdominal viscera and the hind extremities extending over four hours was accompanied by but slight change either in the circulation or the respiration, and microscopical examination of the brain cells showed no morphological alteration. Judging from a large number of experiments on normal dogs under ether, such an amount of trauma would have caused not only a complete physiological exhaustion of the brain, but also morphological alterations of all the brain cells and the physical destruction of many. We must, therefore, conclude that although ether anesthesia, or any inhalation anesthesia, produces unconsciousness, it is in reality only a veneer, as it protects none of the brain cells against exhaustion from the trauma of surgical operations.

These experiments showed us conclusively that if the connection be-

tween the brain and the traumatized part could be broken, the brain cells would be protected from damage, and we found that this could be accomplished by a thorough infiltration of the tissues to be traumatized with a local anesthetic.

By the use of a non-oxidizing general anesthetic—nitrous oxide, and of a local anesthetic—novocaine, we achieved the thorough protection of the brain cells from danger during the course of the operation itself. But we have postulated already that psychic strain may be as active as actual trauma in producing shock. How then may we extend our technique to cover the preoperative dread of the approaching ordeal, especially in such cases as goitre patients in whom the psychic factor is most dominant? To accomplish this end our search was for a drug or drugs which would produce quiet and solace, and so conserve the output of energy, while at the same time they would cause no brain-cell changes. Morphia and scopolamine filled this need. Morphia and scopolamine in physiological doses prevent psychic shock. Under the influence of morphia no one is brave, no one is a coward; one is indifferent to danger. This negative state induced by morphia and scopolamine is due to their action in depressing the associational power of the brain, in limiting or obliterating associational memory.

By the technique thus far developed we have protected the brain cells from preoperative psychic strain and from damage in the course of the operation itself. If we can now find a procedure which will diminish or eliminate postoperative suffering, the protective cycle will be complete. By our continued experimentation we found that this end could be secured by an infiltration of the parts surrounding the line of suture with quinine and urea hydrochloride. This block between the operative field and the brain lasts for hours, sometimes for days, so that when the effects have worn off the patient is well on the road to recovery.

By these means there has been developed a new operative principle, for which we have coined a new word—‘anoci-association,’ which means that by the use of this principle the action of the nociceptors has been blocked. As we have indicated, and as the term implies, this principle finds its special application in operations upon those parts of the body most liberally supplied with nociceptors, that is, those parts which in the course of evolution have been most frequently subjected to injury—the face, the throat, the hands and feet, the abdomen. In operations on the deep parts of the back, behind the peritoneum and on the brain, little shock is produced, even without the aid of this technique, since in our phylogenetic history these parts have been little exposed to injury.

To carry out the principle of anoci-association requires a careful and expensive technique. We have shown that the desired end cannot be obtained by the use of a single anesthetic. The preoperative strain must be reduced by the hypodermic administration of morphia and scopolamine; an inhalation anesthetic must be used to exclude the psychical

stimulation of the brain cells in the course of the operation, and the anesthetic of choice should be nitrous oxide, which is unsafe in the hands of any but a skilled anesthetist; a local anesthetic must be used progressively in the course of the operation to protect the brain from local operative injury; and finally the postoperative effects must be eliminated by a local anesthetic of lasting effect.

For the hospital this means increased expense; for the surgeon and the anesthetist it means special training; for the individual patient it means the elimination of the dread of the operation and the prolonged after results which have so often been sufficient to deter him from accepting the only means of rescue; and, finally, for the general public it means the satisfaction which comes from a decrease in the mortality and morbidity rate, since by these means morbid results and death from shock are eliminated. In view of the last two conclusions, certainly the first is to be disregarded. The expense must be borne, the surgeon and anesthetist must be trained if the increased safety and comfort of the patient are to be gained.

A detailed description of this technique in abdominal and goitre operations will be sufficient to indicate the universal application of the principle.

Anoci-association in Abdominal Operations.—1. Excluding infants, the aged, and patients with depressed vitality, we administer, as an average, $\frac{1}{6}$ gr. morphine and $\frac{1}{150}$ gr. scopolamine one hour before operation.

2. If local anesthesia alone is employed, novocaine in 1-400 solution is used by local infiltration.

3. If inhalation anesthesia is employed, nitrous oxide is administered, either alone or with ether added as required.

4. As soon as the patient is unconscious, first the skin and then the subcutaneous tissues are infiltrated with 1-400 novocaine. The novocaine is spread by immediate local pressure with the hand. Incision through this anesthetized zone exposes the fascia which is novocainized, subjected to pressure, and then divided. In succession also the remaining muscles or posterior sheath and the peritoneum are infiltrated with novocaine, subjected to pressure, and divided within the blocked zone. If the blocking has been complete, then within the opened abdomen there will be no increased intra-abdominal pressure, no tendency to expulsion of the intestines, and no muscular rigidity.

5. The peritoneum is next everted and infiltrated with a $\frac{1}{2}$ per cent. solution of quinine and urea hydrochloride, so that the line of proposed suture is completely surrounded. As before, momentary pressure serves to spread the anesthetic. This infiltration of quinine and urea hydrochloride serves as a block which may last for several days. It prevents, or at least minimizes the postoperative wound pain and gas pains, and by so much prevents or minimizes postoperative shock. Quinine and urea cause a certain amount of edema of tissue which lasts for some time after the wound is healed.

6. With this technique the relaxed abdominal wall permits the easy and gentle exploration of the entire abdominal cavity. If there is no cancer in the field of operation and if no acute infection is present, then the following regions may be blocked as completely and in the same manner as the abdominal wall—namely, the meso-appendix, the base of the gall-bladder, the uterus, the broad and the round ligaments, the mesentery, and any part of the parietal peritoneum. Since operations on the stomach and intestines cause no pain if they are made without pulling on their attachments, in such operations no novocaine block is required.

In operations carried out in this manner the closure of the upper abdomen is as easy as the closure of the lower; all is done with ease in the perfect relaxation. What is the result? No matter how extensive the operation, no matter how weak the patient, no matter what part is involved, if anoci technique is perfectly carried out, the pulse-rate at the end of the operation is the same as at the beginning. The postoperative rise of temperature, the acceleration of the pulse, the pain, the nausea, and the distension are minimized or wholly prevented.

Anoci-association in Graves' Disease.—The writer believes that everyone will agree with him that a technique, that can carry an advanced exophthalmic goitre case through an operation, without increasing the pulse-rate, can all the more readily do as much for any other condition.

If ligation is made, it may be performed without removing the patient from his bed. In such a case nitrous oxide may or may not be administered, but a complete blocking of the local field with novocaine during the operation is essential, as is also a complete quinine and urea hydrochloride infiltration at the close of the operation.

If lobectomy is to be performed, fictitious anesthesia under the guise of an inhalation treatment is administered for several days previous to the operation. On some day then, without his knowledge, but with previous consent, the patient is anesthetized with nitrous oxide in his own room, and so is kept free from preoperative psychic strain. When completely anesthetized the patient is taken to the operating-room. The progressive division of tissue is preceded by a progressive blocking with 1-400 novocaine, so that no activating impulse may reach the brain. Before the wound is closed the entire raw field is infiltrated in every part with quinine and urea hydrochloride. The patient, while still unconscious, is returned to his room and anesthesia continued until his room is completely restored to its previous condition. In the course of the whole cycle from his room to the operation and return, the brain has received no activating stimuli, and as a result there can be no change in the pulse.

This immediate control, however, is not the end of the benefit to the patient. The postoperative hyperthyroidism is prevented or minimized, that is, the later clinical results are improved equally with the immediate results,

Every surgeon knows the disastrous results to a patient suffering with Graves' disease when he is subjected to a severe psychic shock, to a heavy strain or to deep worry. The disease is aggravated for weeks or for months, and the psychic strain may culminate in death. So the stress of facing the ordeal of an operation subjects the patient to a strain which may be perpetuated for days, weeks or months by its frequent recall, or death may be the immediate result. From this handicap the anoci patient is free, and by so much is his convalescence speeded on its way.

The proof of a surgical principle is found in the clinical results of its employment. In our adoption of this principle at the Lakeside Hospital we have found that there is no longer need of a postoperative recovery room; that the work of the nurse has been greatly minimized; that the clinical aspect, both in and out of the operating-room, has been altered. Last year the writer and his associate, Dr. W. E. Lower, performed 729 abdominal sections of every grade with a mortality rate of 1.7 per cent. In the Lakeside Hospital service, where all kinds of acute emergencies are met, and where most of the writer's private work is done, there were last year performed, by his associate and himself, operations on 2,672 patients with a mortality rate of 1.9 per cent.—a result never before approached in the Lakeside Hospital. In the last 1,000 operations performed by Dr. Lower and the writer—these operations including every risk of a general surgical practice—the mortality rate has been 0.8 per cent.

CLINICAL OBSERVATIONS CONCERNING THE HEART IN SYPHILIS.*

By HARLOW BROOKS, M. D., of New York,
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It is always a difficult matter to give an adequate exposition of any topic of medicine in a brief paper. It is particularly difficult thus to discuss a subject concerning which little has been heretofore written, and of which little is said in the current textbooks. In order that one may present stably a new or a recently considered subject, one should first establish a basis with the pathological anatomy, followed by a thorough exposition of the symptomatology with all the variations which this entails; then an explanation of the symptomatology from the basis of the pathological anatomy, or from the standpoint of disordered or perverted physiology; this followed by a discussion of diagnosis, especially of its differential features, a consideration of the prognosis and, finally, of the treatment.

Since this is impossible with so broad and important a subject as I have selected, and because a segment of the work only, does not appear desirable for a society discussion, it has seemed best to attempt to cover the entire field in a sketchy and superficial way; and since, therefore, time cannot permit detailed references, or proofs, or full explanations, I am forced to adopt a somewhat dogmatic style, one far removed from the way in which I feel toward this very large and generally misunderstood subject.

Perhaps you will feel that I should preface my remarks by an apology that an internist should take up a subject which in the popular mind is concerned chiefly with the genito-urinary specialist or with the student of skin diseases. I am not interested in the genital lesions of syphilis, nor am I particularly concerned with the forms of skin lesions or disorders which appear in the disease. I am interested, and every other physician, whether he wishes or not, must be concerned with the general contagious infection which constitutes this disease, especially the involvement of the deep viscera, and particularly that system—the circulatory—from which it may be truly said that all other organs and functions are built up. Skin syphilis does not kill. Syphilis of the heart is responsible for death, or is a very important contributing factor to it in 70 per cent. of the mortalities in this infection, according to my statistics.

*Read before the Williamsburg Medical Society, Brooklyn, N. Y., March 10th, 1913.

Indeed, there is some evidence to justify the old dictum that those cases of syphilis, showing the most pronounced dermal and mucous membrane lesions, are those which show the least deep visceral changes, and vice versa. The modern study of syphilis has shown it to be chiefly an internal and not a special problem.

My interest first became aroused in this subject from noting the very considerable number of cases of syphilis in my service, which died with grave, circulatory lesions, either symptomatically manifested or discovered at autopsy. I was thus incited to the systematic study of fifty consecutive autopsies in cases of lues, chiefly in the tertiary and quaternary stages. In this paper,* the character of the lesions seen, their relative occurrence, and the time at which they might appear, were discussed. Those who are sufficiently interested in this side of the subject are referred to this paper for details in this regard, but I may be permitted here to epitomize this aspect of the subject by the statement, that grave lesions of the heart appear in from 50 to 80 per cent. of cases of syphilis studied post-mortem, counting both treated and untreated cases, and that in a high percentage of cases death actually follows as the result of this complication both in treated and untreated cases.

As to the important question, How early may lesions of the heart develop? In my own series of cases I have had one die of a perforated aorta and a very extensive syphilitic myocarditis in a very early period of the secondary stage, and a case seen during the past month in Dr. J. A. Fordyce's wards at the City Hospital, in the secondary period, developed an acute and marked pericarditis and myocarditis which was cured within a few days by salvarsan. One of my late internes has reported to me the instance of a sailor who died in the early stages of the secondary period from a myocarditis and acute cardiac dilatation shown at the autopsy to have been syphilitic. Many, perhaps most instances, develop later in the disease, or in either case symptoms may not appear until years after the primary infection, often so far removed that both patient and physician may fail to connect a skin rash or sore, twenty or thirty years ago, with the present picture of a decompensation, of a double aortic lesion, an acute cardiac dilatation, or a coronary sclerosis or thrombosis.

One other matter before launching into this subject. I object to classifying syphilis as an exclusively venereal disorder. Similar to it, scarlet fever may also be transmitted by sexual contact, and bubonic plague is a venereal disease. Since I have become thoroughly interested in this disease, I have seen so many cases of so-called innocent infection, so many instances where the patient was entirely unaware that he had this disease, or even that he had been exposed to it, that I have almost come to the conclusion that accidental infections may equal in frequency those transmitted in bona fide sexual relations. Seven medical practitioners have

**Medical Record*, February, 1912.

very recently come under my personal observation, who are suffering from this disease, contracted in the course of their professional duties. I am surprised only that when we consider the great frequency of cases of the disease without obvious external manifestations—cases which we daily examine and investigate—we do not all become so infected.

History.—I have, perhaps, said enough already to make clear my opinion that a history of luetic infection is obtained in anything like a clear manner in but a relatively small percentage of cases of syphilis of the heart. According to my hospital statistics there is 70 per cent. of error as regards history of infection, and this in a series in which the diagnosis was made or verified *at autopsy*.

In a number of instances, and I think as many or more in private than in hospital practice, the patient wilfully denies knowledge of the infection. This is the fault of the bar sinister which public opinion has so long put upon this contagion. This is because the public says, not that syphilis is a serious and menacing contagion to be fought openly and scientifically by the medical profession, but that it is a social crime to be weighed by the lawyer or censured by the clergyman.

With this introduction it is then to be expected that in taking the history of patients suffering from cardiac involvement due to syphilis, one does not ordinarily obtain a definite history of luetic infection. Occasionally, of course, this may be given, or the story of a sore on the genitals or elsewhere which was accompanied by marked adjacent lymphadenitis, perhaps by a sore throat or by a skin rash which has not infrequently been mistaken for a simple dermatitis or a drug rash.

Most cases present themselves to the internist complaining of dyspnea, especially on exertion, of cardiac pain or palpitation, throbbing arteries, weakness, and, in brief, of the symptoms of a myocarditis, an endocarditis, or of an aortitis; and on physical examination the physician finds either or several of these conditions. In my own series it may interest you to know that I have found (at autopsy) associated mitral and aortic lesions to be the most frequent in so far as the endocardium is concerned; a pure aortic endocarditis is next most common and, after it, irregular involvement of the other heart valves. At post-mortem, I have never as yet found a syphilitic pure mitral lesion, but I believe, however, not only that they exist, but that they are frequent and, I may also add, very curable; for among the very earliest symptoms of cardiac involvement in lues, Dr. J. H. Carroll and myself have found a soft systolic murmur at the apex transmitted to the axilla and exaggerated on exertion.

Although we have found mitral disease to be clinically frequent, there is no disputing the old and well-established fact that syphilis shows a definite affinity to attack the aortic valves, and with this, of course, the conus arteriosus.

As we have already indicated, these cases come to us with a cardiac

or circulatory history; and, even where intelligent patients are aware that they have had lues, they are quite likely not to mention it, believing it to be of no bearing on their present condition; and one is tempted to diagnose the cardiac lesion simply as one of aortitis, myocarditis, or endocarditis, and to treat and prognose accordingly as though the lesions were septic, rheumatic, or of idiopathic origin. It has become my custom, where I cannot obtain a suitable explanatory history from the patient with such a story and circulatory findings, to assume that it is caused by lues until I find other explanatory data, either on physical examination or in the history narration. If you are willing to act on this basis and submit the case as one does a suspicious or indeterminate lesion of the brain or cord to the Wassermann test, or to the therapeutic test, you will be gratified, in a very considerable number of cases, with the results which you will obtain, and doubtless be surprised with the number of bona fide cardiac lesions which you will find yourself able actually and truly to cure; and in cases of error no harm is done to the patient.

Course.—It is a very difficult matter to give a composite story of the course of these cases of cardiac involvement in lues. Would you expect to get a coherent consolidated story of a coronary sclerosis, which is one of the most frequent cardiac lesions in lues, of an aortic, mitral or tricuspid endocarditis, and of a myocarditis and cardiac aneurysm or of an aortitis? Yet all these lesions frequently occur, and often collectively in this disease. I can, therefore, give you no consecutive account of the course of the disease, except that customarily it is progressive, and that it is one in which you will be early impressed with the observation that, though definite valvular signs and symptoms may be present, *the factor of myocardial involvement becomes daily and progressively more dominant.*

We have found, both post-mortem and clinically, that luetic disease of the heart is very generally characterized by a tendency toward early and extensive involvement of the muscle; and this in turn we have found to be very generally due to primary disease of the coronary artery. Hence, it is that one finds in the clinical study of these cases, that if treated simply by the usual methods of cardiac stimulation, etc., but little or temporary progress is made, and the tendency toward decompensation is more marked than in the usual case of endocarditis or even of simple myocarditis. All those who have taken up this study have been impressed with the fact that circulatory symptoms alone often appear without other indications of luetic involvement.

Diagnosis.—The determination that a cardiac lesion is present is commonly a very easy matter. The patient generally comes to you with a history of circulatory defects or cardiac chief complaints, but perhaps also with lesions of the central nervous system of the bones or skin, or of the kidney; and in the course of the general examination the cardiac lesion is discovered—usually, however, the patient appearing because of

the indications of circulatory defects. It is, of course, by no means always easy to determine just what the precise heart lesion is; but, in this disease, this is relatively unimportant except in the question of prognosis, when it does become of very primary bearing. The great question to decide, *Is, or is not, lues the cause of these lesions?*

I have already brought out the fallibility of the history factor in diagnosis, and to a certain extent we have discussed the reasons of this. I have also stated my belief that we are justified in the therapeutic assumption that an idiopathic cardiac lesion, not of congenital nature, is luetic until it has been proved not to be. This brings us to the consideration of the utility of the Wassermann reaction or of its several modifications.

I do not pretend to assert that the Wassermann reaction is infallible, either positively or negatively, yet there can be but few who are prepared to say that it leads to 70 per cent. of error, the percentage which I found to obtain when one depends either upon a direct history of luetic infection or upon the recital of fairly definite symptoms of the infection. When the Wassermann reaction is reported positive by a competent observer, in these cases of heart syphilis I believe that it is incorrect in but a very small percentage of instances. If we stop to inquire into the reason of this unusual accuracy, we find a very simple explanation, especially pertaining to syphilitic processes of the circulatory system; for with involvement of the channels, through which the blood circulates, it is quite to be expected that this fluid should almost infallibly give the reaction. As a matter of clinical observation it appears to us that the Wassermann reaction is positive in these instances of circulatory involvement in an even higher percentage than in other forms of late syphilis.

In regard to those cases in which a negative Wassermann reaction is reported: We have not accepted this result as conclusive in patients when the history was suspicious and no other adequate explanation of the cardiac lesion could be ascertained. In several instances in which, in spite of a preliminary negative Wassermann reaction, antisymphilitic treatment has been introduced, after a few days of treatment a very pronounced Wassermann reaction has developed. This peculiarity is by no means limited to cases of cardiac involvement, but appears in many other examples, particularly of late syphilis, so I am informed by Dr. A. C. Mandel. The older Wassermann technique has seemed more accurate to us in this work than its modifications.

Although it is true that signs of marked cardiac involvement appear in most cases only later in the disease, Dr. Carroll and I have shown that this is by no means always the case; and in the introduction to this paper several of a considerable group of such instances are cited from our own observations. Examination of the meagre literature on this subject also shows similar examples in the experience of others. Through the kindness of Dr. Fordyce we have been permitted to make a study of the circulatory system in the early stages of syphilis, occurring in his

service at the City Hospital, with the result that we are frequently able to detect, clinically, evidences of cardiac and arterial invasion early in the disease; just as we, together with others, have been able to show anatomically that serious lesions of the heart, aorta and particularly of the coronary vessels and of the heart muscle may appear in the early stages of the infection. Indeed, what else is to be expected with a disease which is a clear-cut lymphemia and septicemia, and why should not the wall of the channels through which the infection courses be frequently and early diseased? They are.

Prognosis.—What is your prognosis in a myocarditis which has sufficiently advanced to cause diagnosable symptoms? It must be bad. What is the prognosis in cardiac disease of idiopathic or septic origin in which coronary disease has become manifest? It must be bad. What is the prognosis in an endocarditis in which an early evidence of myocardial involvement with threatened decompensation appears? It also must be bad.

It would seem then that prognosis in these types of disease of the heart, when caused by the syphilitic virus, would also be bad. Other factors, however, come into play in luetic disease. Nearly all diagnosed cases of syphilis are well treated at least for so long as mucous membrane or skin lesions present themselves—just as long as these show the patient is willing to submit himself to treatment and to observation; hence, it is that at least for a time many or most cases of cardiac involvement are correctly treated even though unrecognized. Furthermore, the lesions in the heart are as definitely syphilitic as those in a bone or muscle; they cease, heal and resorb under proper medication entirely unlike the idiopathic or simple inflammatory and degenerative lesions of the heart muscle, valves and arteries. Hence, it is that we find that these cases not infrequently become arrested and even healed, doubtless in many instances entirely without recognition. Even in the very late stages of the disease, or when advanced decompensation has manifested itself, one may be greatly surprised by the striking benefit which follows the proper course of treatment; or even sometimes without treatment those periods of automatic cure or staying may appear, which in syphilis, as in so many other infections, occasionally bring about seemingly impossible results.

Add to this tendency the results which vigorous modern treatment may achieve, and one is soon convinced that a grave prognosis is not fully justified in any case until treatment has been tried. It is also true that a cheerful prognosis is not permissible until it has been determined just how much may be achieved by proper treatment. So frequently have I been deceived in both directions, that I now refuse prognosis until the case has been under treatment at least for a time; after which from the degree and character of the improvement or its failure, one may quite accurately prognose what may be expected with a further prosecution.

By no means infrequently endocardial murmurs disappear completely. Collins and Sachs called attention to this some four years ago, and yet this important fact has not yet pried its way into many textbooks. Our post-mortem studies have apparently demonstrated that even a serious grade of myocarditis may also be completely removed, or cured, under proper medication, and that serious arterial changes, such as occur in the coronaries or in the aortic arch, show surprising improvement.* Loncope** cites a considerable series of cases showing very marked improvement or actual cure of circulatory lesions of the gravest sort. In one of my cases which remained for a long time under observation, an aneurysmal sacculum of the aorta greatly decreased in size, if we may trust for the determination of this fact to carefully studied x-ray plates.

Notwithstanding these unquestioned brilliant results, it is very unsafe in our experience to promise too much before the results of treatment have had time to become apparent. There is no way in which one can determine, clinically, just how much heart muscle has been really destroyed, or just how much irradicable fibrosis has taken place, or to what permanent degree the all-important coronary trunks have become diseased. One must also remember that it may well be that not all the lesions found in a syphilitic heart may be due to lues, but that such associated conditions, as rheumatic or septic processes, may also be present. Where calcification has taken place, it is, of course, much to expect, even with the most carefully applied treatment, that resorption and complete physiological recovery can be expected. Perhaps it is well in regard to luetic disease of the heart, as in so many other medical conditions, to give a pessimistic prognosis and an optimistic treatment.

Treatment.—It is obvious that the first or primary treatment must be along simple cardiac lines. If the case is such a one as, independent of the cause, should be put to bed, this should, of course, be done at once. If digitalis, strophanthus, adrenalin, or camphor seems indicated, it is to be given, and in our experience no contraindication to its employment exists in these cases; but our observations have led us to expect less in the way of drug benefit because of the almost universally severe grade of muscle disease in luetic cases. In only one essential respect do I differ, in the preliminary management of cases of cardiac involvement in syphilis, from that of simple or idiopathic origin. When, ordinarily, one would place a heart case on graded exercises, I refrain from doing this until after specific medication has been introduced, when I believe the cause to be syphilis because it has been found that, owing to the almost universal invasion of the coronary trunks and of the heart muscle, in both of which conditions no distinctive symptoms may be manifest, sudden rupture or dilatation may occur—a calamity which I believe may be obviated or delayed by specific treatment. A striking example of this

*Brooks (*Trans. Buffalo Academy of Medicine*, December, 1912.)

***Archives Internal Med.*, Vol. XI, No. 45, 1913.

point occurs to me. A gentleman had just passed a thorough life insurance examination for a large policy. On his way home from the train, which had taken him from his work in town to his country place, while climbing a small hill against a strong wind, he was suddenly seized with a sharp pain in the region of the heart. Death shortly took place, and at autopsy I found a rupture of the heart with hemorrhage into the pericardium. This was due to an extensive syphilitic myocarditis with fatty degeneration and to disease of the coronary vessels. Syphilis had never been suspected, though the patient had been under the care of a most careful and skilful practitioner.

With the exception already noted, in so far as we have been able to determine, the usual methods of heart therapeutics are about as temporarily successful in these instances as they are in simple cases; and it goes without saying that throughout the whole course of treatment the usual methods are constantly employed, and one might, did time permit, quite logically divide the treatment of these patients into the cardiac or symptomatic method and the specific. With the former, everyone is more or less familiar, and I have nothing new to offer; but in regard to the latter—the specific methods—I do desire to place before you certain methods which have proved happily successful in a considerable number of my cases.

The social position of the patient is of considerable importance in many instances. Where time is a very important factor, and after a few days of observation of the patient, preferably under varying conditions, that is in bed, at business, after exercise, etc., I prefer to give him salvarsan. I prefer this drug, not because I believe that it is in itself better or more certain than mercury in its effects, but because I believe that it is far quicker, and in any instance I follow up the arsenic by the use of mercury. Where time is not so important, or where the patient is unable to give up the day or so in bed, or under close observation, which I always demand of him who takes salvarsan, I start on the use of mercury.

By preference, I administer the mercury by the intramuscular method, and my custom has led me to prefer the salicylate suspended in albolene, very likely because I have become most familiar with this form of the drug. In other cases I use mercury by inunction, in still others by mouth in the form of bichloride or the protiodide, and in occasional instances, where neither of these methods is well borne, I have resorted to the uncertain, but in some cases, splendidly efficient vapors of calomel.

I prefer to continue the mercury until perfectly certain that benefit is obtained; for I desire thus to secure therapeutic corroboration of the correctness of my diagnosis before the patient is submitted to salvarsan. In some instances, where the progress is satisfactory and the drug well borne, the patient is continued indefinitely on mercury. For example, at present there is under my care a fire chief who came to me so dyspneic

and was suffering so much pain that he was unable to work, and was before the board of retirement because of physical disability. Examination showed a marked double aortic murmur, dilated heart, and a probable active aortitis. He was temporarily put upon the protiodide of mercury by mouth. After two months' treatment he was returned to work, is now again doing his full duty, and has recently passed the required physical examination of this department. The retiring board, which has not, of course, been acquainted with full particulars, is greatly troubled over the disappearance of the double aortic murmur, and I presume are still trying to figure out how they came to find such a lesion when none could have existed. This man did not receive salvarsan; why should he, when he is progressing so rapidly and well under mercury alone?

In any case, even where salvarsan is given early in the management of the case, I follow it up with mercury; and though my preference is here, as has already been stated, for the use of the intramuscular medication, I attempt to study each case individually and to adapt the form of the drug accordingly. It is my object at first to push the mercury until its full effect is reached, then to reduce the dosage, and eventually to intermit it, allowing, after one year, periods of intermission of several weeks.

In his early communications, Ehrlich cautioned against the use of salvarsan in cardiac cases, especially where the coronary trunks were presumably diseased. Brietman, who made a study of the cases of mortality after salvarsan injection, points out the same dangers, yet it is in just these very cases that the drug seems most useful; and though careless use entails danger of a very real sort, to which my personal experience bears ample testimony, careful employment is unquestionably much less dangerous to the patient than the neglect to use it.

In the administration of salvarsan I have finally discontinued all but the intravenous methods. I have been forced to select this method because I have had in my own practice, and have seen in that of others, serious sloughs follow the intramuscular injection, and also because I believe that quicker and more certain results follow the intravenous method. I still believe that the deep injections give, however, more lasting effects, and one of my most esteemed colleagues still uses the drug by choice in this way. For the greater part, my preference has been to have these injections made either by surgeons or by others technically experienced, for I hold that the administration of this drug intravenously is a serious procedure. I have the very best reasons in the world for believing this to be a fact, and I always insist that at least, for the first injection, the patient shall remain in bed and under continuous and immediate professional observation.

Of late I have used neosalvarsan to some extent, and apparently with as good results as with the older form of the drug, since it possesses several advantages in the way of easier preparation and administration, and also appears less likely to cause a disagreeable reaction. At first, I was

in favor of giving a maximum dose at the first sitting, but in as much as very serious symptoms, with almost fatal result, have followed in several cases, I now give smaller doses at the outset, usually 0.3 grm. of old salvarsan. The preliminary dose should be followed up promptly by the use of mercury; and within one week to one month, depending on the presence or degree of reaction, another and larger amount should be given. This may be repeated several times, and, according to Dr. Fordyce, as much as over one gram may safely be given in carefully tested out cases, but only to such. Immediately after the salvarsan is given, mercury is resumed and continued as before.

After all symptoms have disappeared, one month or more without treatment should be allowed to elapse, when the Wassermann test may again be made; and if, under such circumstances, it is found negative, specific treatment may be justifiably discontinued for a period of two or three months, when the test should again be tried. The continuation or elimination of future treatment should depend on its result.

I have not as yet been able to secure many instances of permanently negative Wassermann reactions, but I am not at the present writing prepared to say that treatment must be continued until a negative Wassermann reaction becomes permanent. I am rather inclined to think that this will mean, in a good many instances, a lifetime; and yet I have seen cases apparently fully cured, in so far as signs and symptoms were concerned, yet show a persistent positive Wassermann reaction.

I cannot conclude this very brief discussion of the use of salvarsan without voicing my opinion that this drug is particularly dangerous if unwisely given in cases of cardiac involvement, but I am absolutely convinced that the results in these cases fully justify the risk.

As to the use of the iodides in heart disease due to syphilis, I am one of those who believe that the iodides have little specific action against the syphilitic virus; nevertheless I use the iodides very extensively in syphilis, because I believe that they have a very direct beneficial action in the promotion of absorption of deposits and exudates in the tissues and, perhaps, even in the readjustments or absorption of fibroses. I use the substance in nearly all instances after or associated with the arsenic and mercury, attempting to adapt, as with the other drugs, the form of administration to the individual. I may also say that I also use the iodides in simple and non-syphilitic myocarditis, coronary and aortic scleroses, and in many instances of nephritis; and I am almost prepared to state that I get as good apparent results from its administration in these simple cases as in those truly luetic. I believe that the salt with potassium gives best results, closely followed in this respect by the iodide of soda.

Finally, I believe that those physicians, who look upon and treat the cardiac complications in syphilis as truly specific in origin and as an integral part of the infection, will receive results which will astonish those who have not previously adopted this point of view; and I feel certain that not only relief, but actually a cure, will result in some types of heart disease which until very recently have been considered as incurable and inevitably progressive.

PRINCIPLES OF TREATMENT IN MALNUTRITION AND
ATROPHY OF INFANTS.

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Since atrophy is always a terminal stage of malnutrition, it is neither practical nor expedient to discuss these maladies as separate disorders of metabolism, excepting as regards some of their clinical aspects. Both are results of faulty feeding, occurring most frequently among the babes of the poorer classes and especially among those fed artificially. The large number of cases, occurring among infants fed on starch foods and condensed milk, made reasonable the inference that excess of carbohydrate and deficiency of proteid and fat were important factors in the etiology. But we have never had a satisfactory explanation of the exact mechanism of the metabolic trauma produced by this long-continued malproportion of food elements. More recently, however, work has been done which bears out the hypothesis that we have in these conditions to deal with an absorptive rather than a digestive insufficiency. The application of these principles in treatment seems to have given results previously not obtainable.

Atrophy may, therefore, be looked upon as a result of disease rather than as a disease itself. Symptoms which are always present in this condition are emaciation, stationary or falling weight in the face of sufficient food, hunger, a flabby, wrinkled skin, and subnormal temperature. Constipation with one or more green, curdy stools a day is not unusual, though often the stool will be well digested. Sometimes, and especially in warm weather, a slight diarrhea is present. A constant symptom is the 'paradoxical reaction of Finkelstein'—the child reacting to increased feeding with a loss of weight. In all the disorders of nutrition characterized by a lowered food tolerance, this reaction is found, but it is especially marked in atrophy or marasmus, for here we have not only a great diminution of food tolerance, but also a remarkable instability of fluid retention by the body tissues. As a result of this fluid instability, several ounces may be lost in twenty-four hours. Fluid depletion is probably a cause of the collapse which sometimes comes in these atrophic states.

Finkelstein's school maintains that the infant is normally able to absorb an amount of food which varies in individuals as to quantity, constituents, and caloric value. Quantities above this normal may not only cause

digestive disturbances, but may have a toxic action. Loss of weight and strength are the results. Food tolerance increases with age from birth during the nursing period, and the greatest tolerance is shown for mother's milk. When the amount of food tolerated is insufficient to maintain life, the case becomes hopeless. These principles have a practical application in the treatment of atrophy.

The studies of Courtney are of great interest.* She found in atrophic infants adequate digestion of proteids, but a deficiency of power to absorb fats. Meyrhofer and Pribram** found that the osmotic power of alimentary mucous membranes, taken from infants who had died from atrophy, was much less than that of infants dying from other causes. This would point to a decreased power in absorbing crystalline substances such as sugar and the mineral salts. Sheible,† after exhaustive work, could find no organic changes to account for the symptoms of atrophy, while the work of Hess with the duodenal catheter shows an actual relative increase in the proteolytic enzymes of the marantic baby as compared with the normal infant. If we accept these findings, we must look upon atrophy as a condition in which foods containing even normal quantities of sugar and fat are not well absorbed and likely to produce intolerance. Rational treatment would suggest a food poor in these particular elements. The loss in heat units by the decrease in quantity of these energizing constituents can only be partly compensated for by increasing the proteid elements. This would give us a food low in its percentage of fat and sugar and relatively high in its proteid—not unlike skimmed milk, excepting that the latter contains its normal percentage of sugar. Buttermilk, albumin milk and albumin-buttermilk fulfil our theoretical requirements more exactly, since their sugar has been diminished by fermentation.

In the writer's opinion no food fulfils the conditions so well as albumin milk, or albumin-buttermilk. Used in twenty-four-hour quantities of one to three ounces to each pound of the infant's weight, these foods will frequently tide babies over the danger of collapse and restore tolerance for other foods. Small quantities should be fed at first and gradually increased, especially if vomiting is present. Unless the baby is less than a month old, the interval between feedings should be at least three hours. No gain in weight is to be expected at this time, as the main object is to restore the food tolerance. It is well to start with one ounce to every pound of body-weight in the twenty-four hours, increasing gradually until two or three ounces to the pound of body-weight are being given. Then add sugar, preferably a malt sugar, about one-fourth of an ounce at a time to the twenty-four-hour quantity, until an ounce or an ounce and a half is being given. But until the infant has begun to gain steadily it is unsafe to give the larger quantity. The expensive imported

**Amer. Journ. Dis. of Children*, Vol. I, p. 321, 1911.

***Wien. klin. Wochenschr.*, Vol. XXII, 1909.

†*Studien bei Ernährungsstörungen*. Leipzig. 1910.

malt preparation used by Finkelstein may be replaced by a domestic preparation of dextri-maltose which is perfectly satisfactory. The important point is not to force the feeding too early. Often the weight will remain stationary for weeks. But once the child begins to gain, the tolerance for food increases until 60 or 70 calories to the pound of weight are required as compared with 35 or 40 for the normal infant. Buttermilk contains from 10 to 12 calories, albumin milk about 13 calories, and whole milk about 21 calories to each ounce. Dextri-maltose contains about 110 calories in each ounce. It is an easy matter to estimate the caloric value of the twenty-four-hour quantity.

As early as possible, but not too early, these soured milk foods should be replaced by mixtures of skimmed milk and later whole milk. Cream mixtures are usually not well borne at this time. The daily weight record should be scrutinized, and should a rapid loss of weight occur after an increase of food, or in an intercurrent infection as middle-ear disease—a common complication—it will be necessary to start all over again and build up the food tolerance. Months of patient work are often necessary to bring these infants to a normal metabolic standard. Atony of the intestine accompanies the atrophic condition, so when the food quantity of milk is increased, as when milk mixtures are given, the increased food residue finds the intestine unable to cope with it and constipation results. An increase in malt extract, or the use of suppositories will correct this. In severe cases collapse may complicate matters, and this is especially to be feared in very hot weather or during parenteral infections, either with or without overfeeding. Rapid loss of weight, sunken fontanelles, weak pulse and a very low temperature, with pinched, ashen features are danger signals. Whiskey, strychnia by hypodermic injection, salt solution and external heat are all useful in this complication. The following cases are illustrative:—

CASE I.—*Aet.* three and a half months. Harelip and partially cleft palate, referred from surgical wards. History incomplete. Fed on condensed milk after first few weeks. Eczema of face and scalp and numerous infected sores on the face. Emaciated, sunken fontanelle. Rectal temperature 98° F., pulse 145, respiration 27. Three small green curdy stools daily. Weight, 7 lb. 6 oz. Vomiting after each feeding. Was given whole milk—2 oz. to each pound of weight, water to make 27 oz.; 3½ oz. every three hours. Vomiting relieved after the first eight hours. July 4th, weight 8 lb. Malt sugar, 1 oz. added; 4½ oz. given. Vomiting ensued, ceasing when feeding quantity was reduced. The weather became very hot and humid and there was a gradual loss until on July 26th, the weight was 7 lb. 12 oz.—a loss of 4 oz. The stools were well digested. July 28th, collapse occurred. Stimulants were given, and feedings of albumin milk—1 oz. to each pound of weight in twenty-four hours, five feedings, four-hour-interval. The quantity was rapidly increased until 3 oz. were given to the pound weight. Improvement was rapid. On August 7th, nine days after the collapse, the infant looked well and had gained 4 oz. One ounce of dextri-maltose was now added to the albumin milk. August 26th, was given the following formula: Skimmed milk, 16 oz., dextri-maltose, 1 oz., water to make 30 oz. Five ounces at a feeding. Weight, August 30th, 8 lb.

6 oz. A gradual gain resulted until on September 16th, the infant weighed 9 lb. 12 oz., a gain of 22 oz. On this date 5 oz. of whole milk were added to the formula and $5\frac{1}{2}$ oz. were given. On September 20th, the formula was changed to whole milk, 18 oz., dextri-maltose, $1\frac{1}{2}$ oz., water to make 33 oz. The infant now weighed 10 lb. The eczematous eruption had begun to reappear. September 22nd, weight 9 lb. 8 oz.—a loss of 8 oz. in forty-eight hours. Eczema pronounced. Skimmed milk was substituted in the formula, and normal gaining was resumed. The eczema also improved. Whole milk was cautiously added until on November 3rd the formula was: Whole milk, 20 oz., dextri-maltose, $1\frac{1}{2}$ oz., water to make 39 oz. Six feedings of $6\frac{1}{2}$ oz. Weight 11 lb. Operated on January 27th, successfully. Discharged February 5th, aged ten months, weight 14 lb.

CASES II and III.—Twin babies; mother died of eclampsia in giving birth to them. Babies born at eighth month of intrauterine life. Fed on cream mixtures and lost weight steadily. Transferred to pediatric ward, aged six weeks. No. II weighed at this time 4 lb. 2 oz.; No. III, 3 lb. 14 oz. Both infants showed restlessness, hunger, emaciation and subnormal temperature. They were too weak to suck and were fed by nasal tube. Since both cases ran an identical course, only one—Case II—will be detailed. Buttermilk 2 oz. to each pound of weight was given each twenty-four hours for a week. An ounce of sugar was then added in increasing fractions. Feedings were at three-hour-intervals. One well digested stool daily. The following is the record:—

September 15th, 4 lb. 2 oz.

September 30th, 4 lb. 14 oz.

October 1st, 5 lb. 2 oz. Nasal feeding discontinued.

October 15th, 5 lb. 10 oz.

October 24th, 5 lb. 11 oz. Formula changed to 12 oz. whole milk, 1 oz. malt food, water to make 24 oz.

October 28th, 5 lb. 8 oz. Loss of 3 oz. Skimmed milk replaces whole milk.

November 1st, 5 lb. 10 oz. The paradoxical reaction given above occurred in both infants.

November 10th, 5 lb. 13 oz. Whole milk replaces skimmed milk.

November 15th, 5 lb. 10 oz. Skimmed and whole milk, each 6 oz., malt food $\frac{3}{4}$ oz.

November 29th, 6 lb. 8 oz.

December 10th, 6 lb. 14 oz. Whole milk 10 oz., skimmed milk 6 oz.

December 17th, 7 lb. 2 oz. Discharged, having gained 3 lb. in three months.

Case III discharged on the same date, weighed 6 lb. 14 oz.

CASE IV.—Normal birth, weight 8 lb. Eczema developed during first week. Breast fed at three-hour-interval. Mother's milk became insufficient and a top milk mixture was given. At last maternal nursing was discontinued. The writer saw the case at three months of age. Infant weighed 7 lb. 2 oz. Was emaciated, hungry, and cried continuously. Skin was flabby with diminished tissue turgor. Temperature was subnormal. Vomiting of sour fluid after each feeding. Several small greenish stools daily. Was given albumin milk, 1 oz. to each pound of weight, divided into six feedings. Vomiting ceased. Amount of food was gradually increased to 3 oz. per pound of body-weight. Improvement resulted in infant's appearance and behavior, but weight remained the same. Small quantities of malt food were now added up to 1 oz., and the following week a gain of 4 oz. resulted. The weather became hot and humid and the patient developed a diarrhea. A feeding was then arranged of skimmed milk, 2 oz. to each pound of weight. The stools became normal; $\frac{1}{2}$ oz. malt sugar was added. This was gradually increased to 1 oz. Weight after one month of this feeding 7 lb. 14 oz., a gain of 12 oz. during hot weather. A mixture of

skimmed and whole milk, equal parts, 2 oz. to each pound of weight, with dextri-maltose 1 oz. and sufficient water was now given. Whole milk was later substituted and the malt sugar increased. Frequently a diarrhea resulted which ceased on reduction of the fat and sugar. After three months, tolerance was well restored and the infant began to take and digest food in the quantity of 70 calories to each pound of weight. At this time he weighed 9 lb. 8 oz., and was gaining seven ounces weekly.

In all these cases the paradoxical reaction was shown in a typical manner. Sometimes the diminished tolerance is brought about by sudden changes of temperature, sometimes by intercurrent infections, and not always by increase of food. Atrophic babies are less able to withstand variations of temperature than other children, and while fresh air is not only desirable but necessary, extremes of either heat or cold are to be avoided. Otitis media and bronchitis are common complications of this condition. In the writer's series of 15 cases he had 2 cases of bronchitis, 2 of otitis media and 1 of intestinal intoxication with collapse. This latter was the only fatal case, and all these infants were fed artificially. Twelve were treated in the hospital, where results were formerly far from encouraging. This diminution of a high institutional mortality has led the writer to hope that this method of treatment will continue to demonstrate its superiority in the management of atrophy.

It is most important to start with the minimum quantity of food and work up to the maximum slowly, avoiding the reaction from too much food. A gain in weight is not to be looked for in the beginning, for food tolerance must first be restored. Hunger is a symptom of atrophy, and bears no relation to the amount of food given. Since many ounces may be lost in twenty-four hours, the daily weight record is essential. Albumin milk and buttermilk are useful to prepare the way for other foods, but they are only emergency foods and must not be continued too long. After all, the best food for the atrophic baby is breast milk, for it is well tolerated when all artificial expedients fail.

THE PREVALENCE OF ASTHENIC DISORDERS OF THE NERVOUS SYSTEM IN WARM CLIMATES.

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During the practice of neurology in a subtropical climate for a number of years, the writer has been impressed with the great frequency of those types of neuroses, which we regard as founded upon asthenic states of the nervous system and which we usually designate as neurasthenic in character. The predominance of this type of neurosis in this climate is out of keeping with what we observe in the larger nerve clinics of this country and of Europe, which are all situated in colder climates.

So prevalent are such neuroses in the Southern section of this country, and so frequently does the neurologist have to deal with this condition, that it seems very obvious that climatic conditions are somehow responsible for their development. We encounter the condition in all degrees, varying from a simple lack of energy to pronounced neurasthenia, and in most instances no definite physical cause can be blamed for it. People of blond complexion are the ones who suffer most frequently in this way, so much so that it has become almost proverbial among physicians that blonds are inevitably neurotic. However, observation regarding the temperament of the blond races in their native climate in the Northern parts of Europe and elsewhere does not bear this out, as it is an established fact that the blonds of Northern Europe are among the most even tempered and stoical of all people. Dr. Charles E. Woodruff, of the United States army, has made extensive observations regarding the effect of tropical climates upon the white man, and he has given quite convincing proof that the blond type of white persons suffers most severely from tropical climate.

Contrary to accustomed belief it is not so much the high temperature and humid condition of the atmosphere which depresses and enervates those exposed to tropical climates, but the intense light of the sun that acts in a deleterious way. One of the best proofs of this is the fact that all aboriginal people in tropical or subtropical climates are highly pigmented in skin, iris, hair, etc., according to the percentage of sunshine to which they are exposed. In fact, it would seem from the clever deductions of Woodruff that light is not essential to good hygienic conditions, and he cites the fact that many animals, including man, in their life habits are accustomed to seek dark recesses in caves or under the

foliage of trees, within houses, etc., during the most intense light of the day, or else adopt nocturnal habits of activity altogether. Those who, because of their environment and the exigencies of their existence, are unable to escape from the rays of the sun are provided by Nature with a highly pigmented skin, hair and other appendages. Those who have studied this subject have established the fact that the so-called short or actinic and ultra-violet rays of the sun have the property of first stimulating the nervous system and finally exhausting it. This is just what the writer has repeatedly observed to happen in the case of the new recruit to warm climates, more especially those tending towards blondism in type—the condition finally culminating in a neurasthenic state.

The fact regarding blondism is that it stands for defection, because indications are that the aboriginal races of the earth were at least brunette in type, some of them even darker; and those who ages ago migrated to the extreme Northern climates, where the percentage of sunshine is very low and where the prevalence of fogs and cloudiness is very great, lost this protective mantle—even as an appendage, which functions no longer in obedience to necessity, is lost.

Many experiments have proved that light is a stimulant to the nervous system, and means have been contrived to apply this agent in therapeutics, such as light baths, the x-ray, etc, which have unquestionable benefit when scientifically used. The system of light therapy evolved by Finsen is applied chiefly to the treatment of parasitic skin diseases, and stands as one of the proofs of the destructive quality of certain light rays—in this instance, toward low forms of life. Like all stimulants, light, when applied in excessive doses or for a prolonged interval, tends to exhaustion. We see still another evidence of the highly sensitive reaction of the nervous elements to light in the case of the optic nerve and retina. Although these structures are specialized to the reception of light impressions in their service to body function, it has remained necessary to safeguard them against overstimulation and exhaustion by a mantle of heavily pigmented choroid and iris, the latter structure being empowered with the means of quickly contracting, so as to narrow the pupillary orifice against the intrusion of excessive light. Intense light may, nevertheless, exhaust the retinal structures, this being seen in exposure to strong artificial light, snow blindness, etc. In the case of the structures subserving the other special senses, such exhaustion is not noted from excessive application of the stimuli to which they are devised to respond.

Relative to the proverbial sluggishness, indolence and reduced activity on the part of those who reside in tropical climates, it must be conceded that such is partly the case. However, climatic conditions cannot be wholly blamed for this, because the means of subsistence are more easily had in hotter countries; and, as we are all prompted in most of our activities by necessity, lack of necessity is one of the reasons for lack

of energy on the part of inhabitants of warm climates. It also seems quite certain that excessive humidity, warmth and a high percentage of sunshine, as before implied, enervates the organism. The writer has traveled in tropical countries in addition to having had special observation of nervous disorders prevalent in the Southern part of America, and can easily confirm the assertions of Woodruff and Dexter regarding the great prevalence of neurasthenia and psychasthenia in these sections, as well as the fact that blondism is a distinct disadvantage to those who essay to live in such climates.

Louisiana was originally peopled by Latins, but later blond types from Northern Europe came in. The latter had the greater difficulty adapting themselves. Relative to one race of people, the writer has had occasion to make a rather interesting observation. The German population in New Orleans is composed of two elements—the blond Teuton from Prussia and Saxony and the brunette from Bavaria. Notwithstanding that the original habitats of both classes is not dissimilar but rather quite identical as regards temperature and other conditions, the blond German suffers inconvenience from our climate, whereas the Bavarian does not have such difficulties. The result is that the more stable part of our German population is composed of the dark-complexioned Bavarians who thrive very well here. Sunstroke and so-called heat insolation occur, according to the writer's observation, most frequently in people of blond complexion, although brunettes and even negroes are not excepted. It will be recalled that dark objects absorb as well as lose heat more rapidly than lighter colored substances. Dark races seem, therefore, to enjoy no real advantage against the heat itself. Negroes, one of the aboriginal races in hot climates, are notoriously night prowlers, and will quite as quickly as the white man retreat from the heat of the sun as well as make attempts to protect themselves with the proper clothing.

Either directly or indirectly, as a result of the excessive action of light rays on the nervous system, the digestive functions become disordered or reduced in activity. This fact has led to the common practice, on the part of inhabitants in hot climates, of the excessive use of peppery condiments and alcoholic appetizers. Such a practice is in itself harmful, as it has the effect of inciting a desire for food, when food is not needed, since the small amount of heat radiated from the body reduces the need for food greatly. Excessive eating in hot climates is one of the indiscretions leading to the development of some of the nervous conditions referred to.

However, it seems on full consideration of all those factors tending to disturb the health of residents in warm climates that the excessive effect of sunshine is most to be shunned. This purpose is best accomplished by so regulating the activities as to make it possible to retire from the open for several hours in midday. Such habits are looked upon as laziness by those accustomed to live and work in colder climates,

but such a universal practice by the people of all hot countries is itself partly proof of its necessity. Not only retreat into houses from sunlight at that time of day should be practised, but such clothing should be worn as affords the greatest resistance to penetration of the sun's rays. It would seem that the opacity of clothing is the thing to be sought for. Most articles of clothing have this quality. This is a special merit of perfectly white garments. There is one kind of clothing which is erroneously thought good for wear in hot countries—namely, that made from cloth with wide meshes. Such clothing is supposed to afford the advantage of allowing rapid radiation of heat from the body, but it has the obvious disadvantage of allowing too much penetration of the sun's rays.

In regard to eating, a great many fallacies are held even by medical men. Aside from the obvious fact that animal food affords a large quota of fat substance and oil going to the generation of body heat, the writer never has been able to see any advantage or disadvantage in any special article of diet in hot countries. The whole question is to avoid the consumption of excessive quantities, and the best guide to the quantity of food needed is the appetite when not excited by irritating condiments and alcoholics. The use of alcohol not only has this disadvantage in hot countries, but it seems to have a disturbing effect upon the liver and stomach, as well as upon the nervous system. Alcoholics are especially prone to develop sunstroke.

The mode of architecture almost universally adopted by residents of hot countries is that of straight walls, heavy blinds and the other means to exclude light. It is a common practice to exclude the sunlight and use artificial means of lighting, and not without reason. If, in the subdued light or darkness thus obtained, proper ventilation and safeguarding against dampness are provided, the arrangement is highly satisfactory.

THE TREATMENT OF SCIATICA.

By G. ALEXANDER YOUNG, M. D., of Omaha.

The treatment of sciatica is not an infrequent question to come before the busy physician, and a short résumé of the methods in vogue may be useful.

Sciatica, either as a neuralgia or a neuritis of the sciatic nerve, may prove easily amenable to treatment or may prolong itself for months or years as an intractable painful condition.

The first essential of treatment is the diagnosis, if possible, of the pathological condition present. First of all, Is the pain that of a sciatica? Is the pain so-called idiopathic sciatica, or the result of a secondary process due to some adjacent disease? We should remember that pains of the lower limb simulating sciatica may result from myositis, neuralgic pains of vascular lesions, arthritis deformans of the hip-joint, tubercular hip, contusions of the tuber ischii, osteomyelitis and periostitis of the femur, renal calculi, intermittent claudication, caries, neuralgia and specific meningeal lesions. Again, adjacent inflammatory processes and new growths, both intra- and extra-pelvic, may bring about a secondary neuritis of the sciatic, closely resembling the true sciatica. However, with ordinary care, the diagnosis of sciatica should be made with certainty.

The recognition of the etiology, whether due to chill, to rheumatism, to gout, to trauma, to any of the intoxications as diabetes or lead, should be effected when such a distinction is feasible.

Van Breeman,¹ basing his conclusions upon a series of 124 cases, makes a useful classification of sciatica into (1) the acute form; (2) the chronic; and (3) cases of sciatica wherein the causative agent has become inoperative and the pain continues as the result of secondary changes in the nerve. For the purposes of convenience, the writer proposes to classify sciatica into acute and chronic; and, under the heading of chronic, describe treatment applicable to divisions two and three of Van Breeman's classification.

The pain of an acute attack of sciatica generally does not reach full development for several days, though in a number of cases there may be an antecedent lumbago accompanied by severe pain. Chilling is one of the most frequent and important causes of acute sciatica, and may act in conjunction with the other causes mentioned. The primary treatment, then, should be diaphoretic. A full hot bath followed by hot drinks and frequently repeated doses of tincture of aconite and complete rest may

often cut short the attack. Aspirin, or full doses of the salicylates, may also be used. The bowel should be thoroughly flushed, preferably by salines, and the salines should be continued for several days. The writer often uses one of the natural magnesium waters, such as Hunyadi. Prolonged hot applications locally afford immense relief and should be kept up while the pain is severe. Several hot water bags or properly shaped and adjusted sand-bags will serve the purpose. Hot moist preparations, properly made of several thicknesses of flannel and laid along the course of the painful nerve and covered by oiled silk, dry flannel and paper, are very useful. It is necessary, however, that the applications be changed every fifteen minutes for several hours. Another method of applying heat is the use of the leucodescent or arc lamp, a method that often produces striking results. It would seem, however, as though these light baths have properties, both analgesic and stimulating, apart from the mechanism of the heat effect.

After the first diaphoretic measures have been carried out, a measure, which the writer believes to be most useful, may be instituted. He refers to daily doses of pilocarpine nitrate as applicable to this condition and also to various forms of interstitial neuritis. This method has been strongly advocated by Kauffman² and is applicable not only in the acute form, but in the more chronic forms later referred to. The pilocarpine is given hypodermically in daily doses of 1/6 to 1/10 gr., according to the reaction of the patient. Its action is to stimulate all the secretions—salivary, gastro-intestinal, bronchial, renal and skin—and in its free interchange of tissue fluids probably exercises a derivative influence upon the morbid process in the interstitial elements of the nerve.

The use of pilocarpine may be kept up for ten days or two weeks; to be discontinued then, if no improvement has taken place or to be continued if the case is progressing well. In a chronic case, the writer has continued it for one month with great benefit. He gives the pilocarpine, in the more chronic cases, in the evening, has the patient sweat between blankets, and then rubbed down and placed into a warm bed for the night. Signs of overdose of pilocarpine are symptoms of vesical irritation and rectal tenesmus, which promptly subside upon withdrawal of the drug. It is well to take a little food following the pilocarpine to avoid distress from the increased flow of gastric juice, and it is best to urinate prior to the injection. The presence of heart lesions and advanced arteriosclerosis are contraindications for the pilocarpine.

Galvanism should be used after the first diaphoretic measures have failed to remove the pains. The current should at first be moderate; but, unless there is relief experienced, it should be made stronger until 12-15 milliampères are being used. The electrodes should be large and the current applied for a period varying from fifteen to forty-five minutes. The diet should be restricted and should be one suitable to the uric acid diathesis. Water should be given in free amount and may also be used in the form of high normal salt colonic flushings.

In the chronic forms of sciatica we may have, as etiological factors, the gouty diathesis, chill, mechanical trauma, diabetes, chronic lead or alcohol intoxication, spinal cord diseases, tumor of the pelvic bones or of the femur, pelvic conditions such as diseases of the uterine appendages, and hemorrhoids.

The treatment of chronic sciatica, apart from the correction of adjacent local disease and the intoxications, may be summed up under three heads: baths—both thermal and light—massage, and the injection treatment.

In the rheumatic cases, where the condition results generally from an extension from the muscles or aponeuroses, the electric light bath, applied either by the leucodescent light or the arc light, seems to be attended with most favorable results.

Massage in more recent cases should be used, at first, very carefully. Later, the treatments and movements used should be directed toward extension of the sciatic, and also toward extension of the muscles of the pelvic adjacent to the sciatic. Plate³ emphasizes the importance of extension of the iliopsoas in certain cases of root sciatica with marked scoliosis, claiming the scoliosis to be the result of the affection of the sensory elements in the psoas, resulting in contraction of this muscle.

Dannehl⁴ suggests what seems to the writer to be a rational method of self-treatment by massage and extension in chronic cases of sciatica with perineural adhesions. It consists of the patient taking a full warm bath to relax; and then, while in the water, by placing the foot of the extended leg against the end of the tub, the patient may pull himself over and forward to produce tension on the sciatic. After relaxation, follows self-massage over the painful areas.

Perhaps the treatment of sciatica most in the professional eye, at the present time, is that of perineural injection by the Lange-Schlösser method. This method consists in the injection of 100 c.cm. of 1/10 per cent. of B-eucaine in physiological salt solution into the perineural sheath of the sciatic nerve. The injection is generally made in the gluteal fold, midway between the trochanter major and the tuber ischii, directing the needle slightly upward.

Harris⁵ uses a modification of this method in that he first injects 2 c.cm. of a 1.5 per cent. cocaine solution around the nerve and then follows it up by 100 c.cm. of normal salt solution. He quotes 34 cases of chronic sciatica treated by this method, with excellent results.

While in general the reports of this method in chronic cases are most favorable, there are three possible objections to it. First, cases are reported where repeated injections have failed of results; secondly, that occasionally distressing paralysis of the perineal nerve has followed as a result; thirdly, that many cases of sciatica are cases of root sciatica or involvement of the roots of the sciatic and lumbar plexuses, and as such are not affected by the injection of the nerve in the gluteal fold.

On account of these drawbacks, another injection method, known as the Cathelin and Sicard method of epidural injection, has come into use.

This method aims at the introduction of a 1 per cent. cocaine or 4 per cent. stovaine solution in normal salt into the sacral canal by way of the sublaminal opening in the fourth sacral segment. About 10 to 15 c.cm. are injected at a time.

This method has the advantage of reaching the sacral roots directly; and the writer believes it is preferable except in cases dependent upon perineural adhesion lower down. So far, there has been no record of perineal paralysis; the root sciaticas are more favorably influenced, and the injection is not so painful. The landmarks, in making the injection, are the two rudimentary laminal processes of the fifth sacral segment which bound the sides of the inferior opening of the sacral canal. A moderately slender needle, 6-8 cm. long, should be used. An ordinary lumbar puncture needle would do nicely.

Glimm⁶ advises, after the epidural injection, that mechanical stretching of the sciatic be employed by the bloodless method. He reports 5 cures of long-standing cases by this method.

Blum⁷ recommends the method in severe chronic forms of sciatica, and quotes 3 cases. He also recommends its use in vesical crises of tabes, in intractable enuresis nocturna, and in root pains from compression by new growths.

Wieler quotes 5 cases of epidural and 18 cases of perineural injections, and prefers the epidural method.

There seems to be no question but that the injection method, especially if combined with other measures, such as massage, thermal baths, diet and pilocarpine injections, offers the most promising as well as the most rapid means of treatment.

Before closing the writer wishes to report a case in illustration.

G. W., male, *wt.* forty-five, severe right-sided sciatica of ten months' duration. There were evidences of a sciatic neuritis in a hypesthesia in the region of the musculo-cutaneous nerve, and in a diminution of power in the muscles of the leg. A trophic disturbance was observed in the roughness of the skin and in a small persistent sore which had formed on the outer aspect of the leg. Exacerbations of pain of a grinding character were present nightly. These were specially marked in the region of the sacro-iliac synchondrosis. It was a favorable case for an epidural injection, but the patient, a physician, had read a recent article in the *Journal of the American Medical Association* on perineural injection and wanted that tried. The injection of 100 c.cm. of a 1/10 per cent. solution of B-eucaine was made in the sciatic sheath, and all pains, below the site of the injection in the transverse gluteal fold, ceased. The nightly attacks of pain continued in the region of the sacrum. He was then given daily injections of pilocarpine, grain 1/10, and as much dry heat as could be borne was applied nightly to the sacrum. The pains rapidly decreased, his constipation improved, and his sexual power, which had been nil for ten months, returned, and in a month's time his recovery was complete.

BIBLIOGRAPHY.

- ¹ Van Breeman (*Zeitschr. fuer Physikal. und Diatætisch. Therapie*, September, 1911).
- ² Kauffman (*Zeitschr. fuer die gesammte Neurologie und Psychiatrie*, Vol. V, No. 5).
- ³ Plate (*Deutsch. med. Wochenschr.*, No. 3, 1911).
- ⁴ Dannehl (*Med. Klin.*, No. 31, 1911).
- ⁵ Harris (*British Med. Journ.*, October, 1910).
- ⁶ Glimm (*Muench. med. Wochenschr.*, No. 8, 1911).
- ⁷ Blum (*Muench. med. Wochenschr.*, No. 32, 1910).

AMBLYOPIA FROM HEMORRHAGE.

By JAMES MOORES' BALL, M. D., of St. Louis.

Definition.—Temporary or permanent reduction in visual acuity, due to loss of blood from one or several organs, was noted at a remote period in medical history. The affection, which is found more often after than before the fortieth year, is of unusual occurrence; it is rarely seen in healthy subjects who have been accidentally wounded (*e. g.*, soldiers in battle); and, as a rule, it involves both eyes in about the same degree.

Relative Etiology.—The careful study of this subject which was made by Fries¹ in 1876, after searching the literature of the preceding two hundred and thirty-five years, has furnished the following statistics: Of 106 cases of visual disturbance following hemorrhage, 36 per cent. were from the stomach; 25 per cent. from the uterus; 7 per cent. from the nose; 5 per cent. from accidental wounds; 25 per cent. from intentional loss of blood—venesection, leeching, or cupping; and 1 per cent. from pulmonary and urethral bleeding. Carlini² states that these percentages have not been changed by cases reported since 1876.

The age of the recorded patients has ranged from two to seventy-seven years. When the condition is bilateral, rarely is one eye entirely blind and the other only slightly affected. In only 10 to 15 per cent. of cases is one eye alone involved (Groenouw³). Blindness following gastric hemorrhage is twice as frequent in men as in women (Pergens⁴). That extensive hemorrhage *per se* is not a factor in the production of amblyopia is undisputed. Thus, in the Franco-Prussian War, De Wecker and Knies did not observe a single case of amaurosis following wounds, and only 5 of the 106 cases tabulated by Fries can be attributed to pure traumatism. Nor is there any relation between the extent of the hemorrhage and the gravity of the ocular symptoms. Hence it must follow that, in cases of visual disturbance following hemorrhage, a pre-existing factor or condition is of supreme etiological importance.

The case reported by Stirling⁵ may be cited as typical of predisposing conditions. A boy, *æt.* six, a victim of hemophilia, suffered a transient complete blindness sequent to profuse hemorrhages following the extraction of a tooth.

Disorders of vision following hemorrhage occur, almost without exception, only in persons who previously were not healthy.

Symptoms.—Loss of vision from hemorrhage may come quickly or slowly. In 25 per cent. of cases the loss of sight appeared either during, or immediately following the hemorrhage; in 20 per cent., within the first

twelve hours; in more than 50 per cent., the blindness appeared within three weeks—and in most of these between three and six days after the loss of blood (Groenouw). As regards blindness following gastric hemorrhage, the statistics of Pergens, based on 43 cases, show the following: Immediate loss of vision, in 21 per cent.; loss within the first twenty-four hours, in 9 per cent.; later, but within the first week, 51 per cent.; in the second week, 14 per cent.; and in the third week, 5 per cent.

Amblyopia from intentional blood-letting comes, as a rule, within a few hours; whereas that following accidental hemorrhage appears after several days.

The patient may suffer severe hemorrhage without visual disturbance, only to have his vision much reduced or entirely lost after a recurrence of the bleeding. In repeated hemorrhages vision may become less after each attack, while improvement or entire restoration is noticed during the intervals.

If a severe hemorrhage has caused unconsciousness, the patient, on awakening, will notice the blindness, or may think that he is in the dark, *i. e.*, that it is night-time. Cerebral symptoms—syncope, cardiac palpitation, headache, pain in the back of the neck, or at the base of the skull—are often present.

Following less severe bleedings, and having recovered from the resulting anemia, the patient may think himself entirely well, when suddenly there is a loss of vision.

The external appearance of the eyes is not far removed from the normal. In complete blindness the pupils will be dilated and irresponsive to light. In unilateral cases, the pupil of the blind eye will contract synergetically with that of the normal eye. This is in accord with the well-known facts, that, in unilateral blindness, due to disease of the optic nerve or retina, the pupil of the affected side will be dilated provided the other (normal) eye is covered; while light striking the seeing eye will cause both pupils to contract.

Ophthalmoscopic Appearances.—The ophthalmoscopic findings in cases of amblyopia from hemorrhage may be (1) entirely negative; (2) slightly positive; or (3) of marked degree. In only a few instances has the ophthalmoscopic examination been made within a few hours after the advent of the blindness (cases of Litten,⁶ Schweigger,⁷ Hirschberg,⁸ and Horstmann⁹). In these patients the optic-nerve head presented a washed appearance, with very slight or not any swelling; and the area surrounding the nerve showed a faint opacity, extending to the macula lutea and diminishing toward the periphery of the retina. Small, brilliant spots and minute hemorrhages were seen in the retina.

While in the majority of cases ophthalmoscopic signs are either negative, or are present as slight neuroretinal changes, there remains the small number in which the fundus changes are markedly prominent. The

cases of Groenouw, Ulrich,¹⁰ Stirling, and Theobald,¹¹ may be cited as examples. Such severe cases will show the nerve-head of chalky whiteness; the contour indistinct; the retinal arteries narrowed, and the veins, by contrast, of normal size. Hemorrhages may be present in the retina. These changes may be permanent, or there may be an improvement in some of them. Thus, for example, Groenouw cites a case in which, after an interval of three months, the blurred disc had regained its contour; the attenuated vessels were of normal calibre; visual acuity and the visual field had become normal—but the chalky whiteness of the nerve-head remained.

The ophthalmoscopic findings do not correspond with the degree of loss of vision. With pronounced fundus changes good visual acuity may be present, and vice versa.

Condition of the Fields of Vision.—In those patients who have retained vision of an amount sufficient to permit an examination of the fields, the perimetric findings have shown great variations. The narrowing may be slight and concentric, or so great that only a small island remains. Often the field is irregular and it may assume a hemianopic form, or, only one quadrant may be missing. In a case cited by Uhthoff¹² the nasal half of the field was preserved, the color-fields for blue and red were much contracted, and in the blind temporal half of the retina two small islands were functioning. A normal peripheral field with a central scotoma was observed by Mandelstamm.¹³ In general terms, the field is contracted, but its form is not characteristic.

The Light-Sense.—Few photometric examinations have been made in the class of cases under consideration. Pergens found the light-sense abolished.

Pathology.—Only three post-mortem examinations have been made—the first one by Hirschberg in 1882, the second by Ziegler¹⁴ in 1888, and the third by Ræhlmann¹⁵ in 1889. The findings of Hirschberg and Ræhlmann are of little value, since their cases belong to the later stages of the disease. Ziegler's case, which was studied twenty-three days after the advent of amblyopia, is important.

Hirschberg's specimens were studied three and a half years after the onset of blindness. The right eye was totally blind, and its sections showed a complete atrophy of the optic nerve. The left eye had presented, ophthalmoscopically, a neuroretinitis, and had regained vision of 20/40. In it a circumscribed atrophy of the outer layers of the optic nerve was found.

Ziegler's studies showed a fatty degeneration of the optic nerve and retina, the process reaching its acme in the nerve-fibres adjacent to the lamina cribrosa.

Ræhlmann's patient was a female, *æt.* twenty-three, who became blind on the second day after a severe hemorrhage and died eight weeks later from edema of the brain. Microscopic examination disclosed a marked

narrowing of the lumina of the retinal arteries from endarteritis fibrosa; and the veins presented a similar process. In some areas the arteries were obliterated. The retina was edematous.

Pathogenesis.—It would be unprofitable to enter into a discussion of the numerous theories which have been advanced in explanation of this form of blindness. As Carlini has said, "only the hypothesis based on the accurate clinical observation of each case can be of true value."

A few of the hypotheses, which have been considered seriously, are: hemorrhage into the optic-nerve sheath (von Gräfe,¹⁶ Leber¹⁷); stasis in the retinal veins (Ulrich); thrombosis of the central retinal artery (Theobald); inflammation of the optic nerve with subsequent atrophy (Hortsmann and Hirschberg); a lesion, probably an edema, of the visual centres (Samelsohn¹⁸); anemia of the brain (Fries).

Prognosis.—Amblyopia from hemorrhage is a serious condition which calls for a guarded prognosis. There seems not to be any relation between the amount of blood lost and the degree of possible improvement in vision; nor has the date of the appearance of blindness any bearing on the prognosis. Recovery is possible even after perception of light has been abolished for several days, provided the pupillary reaction to light is retained. In the more favorable cases, the duration of the amblyopia will vary from a few minutes to many hours. In the majority of patients the improvement—if it comes at all—is noticed, not immediately, but after several days, weeks, or even months (Groenouw). As has been already mentioned, the ophthalmoscopic findings do not furnish a basis on which to predicate the prognosis.

The degree of the impairment of vision, existing early in the history of these cases, shows great variations. Singer,¹⁹ who collected 198 cases from the literature (including 106 noted previously by Fries), reports 58.8 per cent. of complete blindness; 32.4 per cent. of partial blindness; and 8.8 per cent. in which blindness was complete in one eye and partial in the other.

The ultimate results, as given by Singer, were: No improvement in 45.9 per cent.; improvement in 39.1 per cent.; complete recovery in 13.5 per cent., with subsequent failure in 1.5 per cent. These statistics practically confirm the statement of Groenouw that "in almost one-half of all cases vision does not improve; in about one-third there is improvement; and in about one-fifth complete restoration of central vision, with—in many cases—defects in the visual field is to be expected."

In amblyopia following gastric hemorrhage the percentage of cures is small. Pergens has collected 50 such cases which ended as follows: 6 per cent. died; 36 per cent. were blind in both eyes; 18 per cent. were blind in one eye; 18 per cent. suffered a marked reduction in visual acuity in both eyes; 14 per cent. obtained useful vision; and in 8 per cent. there was a complete cure.

Treatment.—The treatment of amblyopia following hemorrhage must

be conducted along broad and general lines—bleeding should be checked, rest enforced, a nutritious diet supplied, and iron and strychnia administered. Local treatment of the eyes is not required, and such radical procedures as paracentesis of the anterior chamber and iridectomy should not be considered.

BIBLIOGRAPHY.

- ¹ Fries: Contribution to Our Knowledge of Amblyopia and Amaurosis After Hemorrhage. Inaugural Dissertation, Tuebingen, 1876.
- ² Carlini (*La Clinica Oculistica*, February, 1906).
- ³ Grönouw: In Regard to General Diseases of the Eye. (Græfe-Sæmisch Handbuch, Bd. XI, Abtheil, I, s. 305, 1904.)
- ⁴ Pergens: Amaurosis and Amblyopia After Hematemesis. (*Ann. d'ocul.*, 1876.)
- ⁵ Stirling: Bilateral Amaurosis Following Severe Hemorrhages After Extraction of a Tooth. (*Ophthalmic Review*, August, 1904.)
- ⁶ Litten (*Berl. klin. Wochenschr.*, No. 49, 1880).
- ⁷ Schweigger (Handbuch der spez. Augenheilk., 1873).
- ⁸ Hirschberg: Amaurosis After Hemorrhage. (Sitzungsbericht der ophth. Versamml., 1881.)
- ⁹ Horstmann: Annual Report of the Eye Clinic: Neuroretinitis After Hematemesis. (Charité-Ann., 1887.)
- ¹⁰ Ulrich: A New Ophthalmoscopic Condition After Hemorrhage. (*Klin. Monatsbl. fuer Augenheilk.*, 1883.)
- ¹¹ Theobald: A Case of Atrophy of the Optic Nerves Following Hemorrhage from the Stomach. (*Amer. Journ. Ophth.*, May, 1899.)
- ¹² Uhthoff: Contribution to the Study of Optic-Nerve Atrophy. (*Archiv fuer Ophth.*, Vol. XXVI, p. 275, 1880.)
- ¹³ Mandelstamm: Etiology of Central Scotoma. (*Zentralbl. fuer prakt. Augenheilk.*, 1879.)
- ¹⁴ Ziegler: As to Our Knowledge of the Origin of Amaurosis After Hemorrhage. (*Beiträge zur path. Anat. und Phys.*, Bd. II, p. 57, 1888.)
- ¹⁵ Raehlmann: Sclerosis of the Retinal Arteries as the Cause of Sudden Blindness in Both Eyes. (*Fortschr. der Med.*, Vol. VII, p. 928, 1889.)
- ¹⁶ Von Græfe: Cases of Sudden and Incurable Amaurosis Following Hematemesis. (*Archiv fuer Ophthal.*, Vol. VII, No. 2, p. 143, 1860.)
- ¹⁷ Leber: Amaurosis After Hemorrhage. (Græfe-Sæmisch Handbuch, Bd. V, s. 901, 1877.)
- ¹⁸ Samelsohn: Amaurosis After Hematemesis and Loss of Blood. (*Archiv fuer Ophth.*, Bd. XVIII, No. 2, s. 225, 1872.)
- ¹⁹ Singer (Beiträge zur Augenheilk., Hft. 53, 1902).

OBSERVATIONS ON THE RECOGNITION OF THE VIRUS
DURING THE LATER PERIODS OF SYPHILIS: TWO
SUCCESSFUL INOCULATIONS OF RABBITS
DIRECTLY FROM THE BLOOD OF
GENERAL PARETICS.*

By WILLIAM W. GRAVES, M. D., of St. Louis.

Accepting as postulates that syphilis is a chronic infectious disease and that we have no means of definitely knowing its termination during the life of the infected individual, I proposed, in a recent communication,** the theory of relative tolerance as opposed to that of latency. It seemed to me that a period or periods of relative tolerance for the virus, meaning thereby an excellent, a fair, or a poor resistance of the whole or a part of the organism, was a better conception—one more in accord with clinical experience, the natural history of the disease, and the results of treatment—than that of latency. Indeed, the accumulated clinical experience of centuries, the utilization of all modern laboratory aids and clinical refinements in the recognition of the syphilitic, the recurring constitutional symptoms, the recurrence of local and the occurrence of focal and so-called parasyphilitic manifestations, support the idea that the virus once invading the tissues of the body never becomes wholly dormant.

Certainly, the modern laboratory aids and clinical refinements, now utilized in the recognition of the syphilitic, justify the assumption of many older and modern investigators that somewhere in the tissues of infected individuals the *contagium vivum* exists, and also justify the hope that means may be found by which it might be readily demonstrated in every period of the disease. Nothing short of the actual demonstration of the virus in the various periods of syphilis can satisfy the exacting demands of clinical medicine or lead to the fullest recognition of the protean manifestations of this scourge of the human race. Since the epoch-making discovery of Schaudinn, the demand for means of recognition of the virus in every period of the disease has become more and more insistent, especially so since it was soon found that the blood and lymph-glands yielded inconstant findings, and then only in the early periods of the disease.

My search for the virus in the blood and spinal fluid during the various periods of syphilis has been mainly along five lines of investigation:—

*Read before the St. Louis Medical Society, April 19th, 1913.

***Medical Record*, August 24th, 1912.

1. Studies of the bloods and spinal fluids in smears with various stains and with India ink, and in fresh mounts, in so-called vital stains, and with adequate dark field illumination. Studies of approximately five hundred bloods and spinal fluids in this way disclosed spirochetes in the blood only in 2 cases, and these from the florid stages of syphilis; and only in one instance in the spinal fluid, and this in a case of lues spinalis occurring ten years after infection.

2. The cultivation of bloods and spinal fluids in specially devised ampoules without mixture with other culture media. It occurred to me that if the virus of syphilis could exist for years in the tissues of the body, despite their resistances to it, then either the blood or spinal fluid of syphilitics might prove to be an ideal culture media. More than two hundred bloods and spinal fluids of syphilitics cultivated in this manner failed to show spirochetes in a single instance; but the blood of syphilitics, non-syphilitics, and of animals cultivated in this manner yielded many forms described by others (notably von Niessen, Siegel, Krystalowicz and Seidlicki, Ford Robertson, Ross and McDonough) as stages in the morphology of the virus of syphilis.

3. Through the courtesy of Noguchi, I came into possession of two of his pallidum strains in pure culture, and these I have sub-cultured through many generations and have studied the morphology of spirochetes in these cultures. These studies indicate that the morphology is not as complex as it is usually considered to be; indeed, that it seems to be relatively simple. Further work in this direction may enable us to recognize, either in bloods or spinal fluids, or both, one or more stages in the development of the virus, and thus serve us well in diagnosis.

4. Noguchi media have been utilized by inoculating them with bloods and spinal fluids from syphilitics. One hundred and thirty bloods and forty spinal fluids from the various stages of syphilis have been studied in this manner, and from two of the bloods positive results have been secured. In one of these cases the infection had occurred thirty years and in the other twenty-three years before coming under observation.

5. Bloods and spinal fluids from syphilitics were injected into rabbits' testicles. I have utilized in this line of investigation only the bloods from the later periods of the disease, and particularly from paretics and tabetics. I have thus far used bloods from 5 cases of paresis, and in 2 of these positive results have been secured.

CASE I.—Male, *æt.* thirty-seven, had sustained a luetic infection eighteen years ago and had received two years' continuous mercurialization by one of our leading syphilographers. He became a prominent business man, and is said to have enjoyed good health until four years ago when shooting pains developed about his legs. In October, 1912, he had the first symptoms of general paresis. He was seen by a number of physicians besides myself, and remained under my observation until the time of his death in March of the present year, during which time he was under continuous mercurialization. He had received an intravenous injection of 0.6 grm. salvarsan in July,

1912. February 25th, 1913, a quantity of blood from this patient was drawn from forearm veins under sterile precautions and incubated at 37° C. until March 1st, 1913, and on this date 2 c.cm. were injected into each testicle of rabbit No. 4. A gradual increase in the consistence of the testicles developed after three weeks, and, after an incubation of nine weeks, typical spirochetes were found in the right testicle. At the same time definite crusty lesions were noted about the left eyelids, and four distinct moist lesions were noted about the anus and the perineum. In all these lesions typical spirochetes were found in great numbers.

CASE II.—Male, *æt.* forty-one, had an initial lesion fourteen years ago, and thereafter two years' continuous treatment. He was admitted to Alexian Brothers' Hospital, St. Louis, early in February, 1913, presenting classical clinical symptoms of incipient general paresis and Nonne's four reactions. The blood from this patient was drawn under sterile precautions and immediately injected into rabbit No. 15, on February 22nd, 1913. Seven weeks later a slightly indurated erosion encircling the prepuce and slight induration of both testicles were noted. The testicles have not yet been studied, but bits of tissue from the eroded area show myriads of spirochetes.

The spirochetes in both these rabbits are identical in morphology with those commonly found in syphilitic lesions. Noguchi media, both in diffuse and stab cultures, have been inoculated with tissue emulsions from the lesions of rabbits Nos. 4 and 15, and the testicles of several rabbits have also been inoculated with the same material.

In brief, these are the results of my investigations, which began something more than three years ago, and I shall, of course, continue them. I recognize the incompleteness of my work; yet, the results thus far secured are encouraging and may stimulate others to like endeavor.

A CASE OF MYELOGENOUS LEUKEMIA APPARENTLY CURED WITH THE X-RAY.

By ERIC CARL BECK, M. D., of New York City,
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Myelogenous leukemia is generally described as a fatal disease, the usual limitation of life after the onset of the disease being given as anywhere from six months to three years.

The case the writer is about to report is at the present date in a very healthy condition, eleven years after the first diagnosis was made.

The patient, L. L., a medical student from Baltimore, was referred to the writer in September, 1909, by Dr. Reynold Webb Wilcox. At that time the question of excision of the patient's spleen was debated upon, but as two deaths had followed shortly upon the successful removal of that organ in St. Mark's Hospital, the writer was not quite courageous enough to attempt it.

While treating cases of Hodgkin's disease with the x-ray, he had noticed the very marked action of the ray upon the elements of the blood. He had succeeded in reducing very large spleens in cases of typhoid and malaria by raying them over the splenic area, and decided to attempt the reduction of the spleen in this case.

The patient's history is rather interesting and the writer gives it here in full.

He was a Russian, twenty-nine years of age. His father died at the age of forty-three from meningitis. Mother and sisters are still living. His mother, when twenty-seven years old, had suffered from enlargement of the spleen and had complained of shortness of breath and pain beneath and around the heart. This persisted for about two years when she was 'cured' by taking medicine. Since then she has been a chronic rheumatic.

Patient worked in a government office as clerk. About eight years ago he began to notice difficulty in breathing. Says he always looked pale and anemic. He never felt ill until he came to this country in 1905. At first he was employed translating articles from the Russian into English at Wesleyan University. From there he went to Guthrie, Kentucky, where he worked for an uncle of his in the ice-house and meat-market. As Guthrie is located in a malarial district he soon contracted the disease. His shortness of breathing became more pronounced and he began to feel pains in the clavicle and beneath the seventh rib. In August, 1909, he came to New York, and the diagnosis of myelogenous leukemia was made.

When the writer first saw patient he made the impression of an anemic who was fairly well nourished, but flabby. His heart was good, and he had no temperature. Appetite was fair. He had often noticed blood in the stools. His skin had a peculiar dry feel somewhat akin to parchment, and was dotted here and there with small patches of subcutaneous hemorrhages. These were most marked around the umbilicus and in the small of the back. The skin over the spleen was extremely tender to touch, and the spleen itself extended diagonally across the abdominal cavity, losing itself behind the right iliac crest.

The blood examination at that time showed the following: Hemoglobin, 60 per cent.; red blood cells, 3,200,000; white blood cells, 500,000; myelocytes, 50 per cent.

The writer began the x-ray treatments on the first of October, 1909. At first he exposed the patient to the influence of the rays for five minutes, gradually lengthening the time to fifteen and then to twenty minutes. After about the tenth treatment, given every third day, the hemorrhagic spots disappeared and the border of the spleen became palpable through the abdominal wall. Was advised to stop taking his arsenic, prescribed by his first physician, as the writer desired to judge the action of the rays alone. He had taken a position as book-agent meanwhile, and his appearance began to improve noticeably.

As soon as the contraction of the spleen had progressed to the level of the umbilicus, the long bones were rayed. First the tibia, then the spinal column, arms and shoulders. This was continued until April, 1910, when a blood examination made by Dr. Henry Kreuder, of New York, showed the following: Hemoglobin, 83 per cent.; red blood cells, 5,000,000; white blood cells, 100,000; myelocytes, 10 per cent.

Treatments for a time were stopped and Fowler's solution prescribed. To the writer's surprise, the rectal bleeding began again after about ten days and the hemorrhagic spots also put in an appearance. Fowler's solution was immediately stopped, and one treatment every week was given him until autumn, when he returned to his studies. The spleen then had retracted to within an inch of the costal border.

The writer did not see the patient again until December 21st, 1912, when he walked into his office looking the picture of health, having gained almost 20 lb. in weight. He informed the writer that he had not been bothered with any of his former symptoms, but that at times, especially after a heavy meal or after a few days spent in close confinement without exercise, his spleen again became tender and swollen. A few treatments with the x-ray at the University had always remedied the trouble.

He showed the writer a copy of a blood examination made in the autumn of 1912, in which a small number of nucleated red cells had been found and "a myelocyte here and there after diligent search."

Here then, we apparently have a cure of a case of splenic myelogenous leukemia which had persisted over a period of eleven years. Is there perhaps a 'benign' form of myelogenous leukemia?

MEDICAL AND SURGICAL PROGRESS.

THE PRESENT STATUS OF THE GLYCYLTRYPTOPHAN REACTION FOR THE DIAGNOSIS OF GASTRIC CARCINOMA.

A REVIEW OF RECENT LITERATURE.

By JEROME E. COOK, M. D., of St. Louis.

1. Myer (*Interstate Med. Journ.*, Vol. XVIII, No. 2, p. 246, 1911).
2. Neubauer and Fischer (*Deutsch. Archiv fuer klin. Med.*, Vol. 97, p. 499).
3. Lyle and Kober (*New York Med. Journ.*, June 4th, 1910).
4. Kuttner and Pulvermacher (*Berl. klin. Wochenschr.*, November 7th, 1910).
5. Abderhalden (*Zeitschr. fuer Phys. Chemie*, Vols. 59 and 61, 1909).
6. Emerson (*Deutsch. Archiv fuer klin. Med.*, Vol. LXII, p. 415, 1902).
7. Weinstein (*Journ. Amer. Med. Assoc.*, September 24th, 1910).
8. Neubauer (*Muench. med. Wochenschr.*, p. 674, 1911).
9. Jacque and Woodyatt (*Archives Int. Med.*, Vol. X, p. 563, 1912).
10. Smithies (*Archives Int. Med.*, Vol. X, p. 357, 1912).
11. Weinstein (*Journ. Amer. Med. Assoc.*, Vol. LVII, No. 18).
12. Sanford and Rosenbloom (*Archives Int. Med.*, Vol. IX, p. 445).
13. Smithies (*Journ. Amer. Med. Assoc.*, Vol. LIX, No. 7, 1912).
14. Warfield (*Bulletin Johns Hopkins Hosp.*, May, 1911).
15. Stadelman (*Zeitschr. fuer klin. Med.*, Vol. 16, 1889).
16. Saxl (*Zentralbl. fuer die Grenzgebiet der Med. und Chir.*, Vol. XIV, p. 466, 1911).
17. Pechstein (*Berl. klin. Wochenschr.*, No. 16, 1911).
18. Ehrenberg (*Berl. klin. Wochenschr.*, No. 9, 1911).
19. Ley (*Berl. klin. Wochenschr.*, No. 3, 1911).
20. Kohlenberger (*Deutsch. Archiv fuer klin. Med.*, Vol. XCIX, p. 148, 1910).
21. Oppenheimer (*Deutsch. Archiv fuer klin. Med.*, Vol. CI, p. 294, 1910).
22. Kayser (*Deutsch. med. Wochenschr.*, November 12th, 1912).
23. Feuer (*Mittel. aus dem Grenzgebiet. der Med. und Chir.*, Vol. XXXV).
24. Volhard (*Muench. med. Wochenschr.*, No. 9, 1907).
25. Molnar (*Zeitschr. fuer klin. Med.*, Vol. LXVII, 1909).
26. Strauss and Leva (*Zeitschr. fuer klin. Med.*, Vol. LXV).

Some time ago Dr. Jesse S. Myer and the writer had occasion, in reviewing various laboratory tests proposed as aids in the diagnosis of carcinoma, to mention a test which had been recently advanced as a diagnostic sign in gastric carcinoma. Since then, such a considerable literature has grown up about this test that it is worthy of a more extensive notice.

The test as first proposed by Neubauer and Fischer rests upon the following facts and theoretical considerations: In the peptic digestion of proteid, as it normally takes place in the stomach or *in vitro*, the hydrolysis of the proteid is not complete, *i. e.*, no amino-acids are formed. This is due to the fact that pepsin is unable to carry the proteid cleavage to its final stage in the digestive process, but only as far as the prepeptid stage, the trypsin of the pancreas being necessary to complete the cleavage. Some time ago Emerson was able to demonstrate that the fluids of cancerous tumors had a ferment action similar to trypsin, in that they were able to split proteids past the peptid stage into amino-acids, and others have subsequently confirmed this observation. Therefore, reasoned Neubauer and Fischer, if the juices of a carcinoma are able to split proteid into amino-acids, and normal stomach contents with its pepsin is unable to do this, then the demonstration of such a cleavage power in the gastric juice argues the presence of cancer juices, *i. e.*, the presence of a gastric cancer. In order to demonstrate this power a dipeptid—glycyltryptophan—is incubated with a given amount of filtered gastric juice obtained after a test meal; and, after a certain time, evidence of cleavage is sought by testing in a very simple way for free tryptophan. The reader is referred to the original articles for the complete technique.

Glycyltryptophan is rather difficult to obtain and is quite expensive, so that certain modifications have been proposed to obviate its use. Kuttner and Pulvermacher used a preparation called 'Seidenpeptone' which on cleavage yields tyrosin, whose typical crystals may be recognized under the microscope. This modification has not become popular. Shortly after Neubauer and Fischer's article appeared, Weinstein introduced a modification which has gained some repute and which it is claimed gives parallel results. Weinstein relying on the fact that nearly all proteid food contains a tryptophan radicle, a point noted previously by Abderhalden and mentioned by Neubauer and Fischer, claims that the use of glycyltryptophan is superfluous. Any test meal with a sufficient amount of proteid may be used and the gastric contents tested, on withdrawal or after incubation, for the presence of tryptophan. The modification seems theoretically sound, and has given as satisfactory results as the original test in the hands of most of those who have used it. Quite recently Jacque and Woodyatt have proposed a modification in which Witte's peptone replaces the glycyltryptophan of the original test and in which the results are expressed quantitatively by a titration method. They claim far greater accuracy and reliability for this method.

In their original article, Neubauer and Fischer call attention to certain possible sources of error in carrying out the test: (1) The stomach contents containing blood are unreliable on account of a peptid-splitting ferment in blood-serum; (2) a regurgitation of duodenal contents is to be avoided in obtaining the stomach contents, since the trypsin so introduced gives a positive reaction (the criterion as to whether or not such regurgitation has taken place is the presence of bile, either visually or by chemical test, in the aspirated contents); (3) a high degree of gastric acidity inhibits the action of the cancer ferment and causes an otherwise positive reaction to be negative; (4) a large number of bacteria in the

incubated contents may give rise to error, since certain bacteria have a peptid-splitting power. Anyone with experience will recognize that it might take numerous trials with a given patient to obtain stomach contents which avoid these sources of error. Moreover, it has been urged that the tests for bile in the stomach contents are, for some reason, often unreliable, and give negative results even when bile is present in considerable quantity. Besides, the question of the presence or absence of regurgitated bile being a sufficient indicator of the presence or absence of regurgitated pancreatic juice is very doubtful.

In addition to those mentioned by Neubauer and Fischer, certain other sources of error have come into question. Warfield first called attention to the fact that saliva mixed with neutral or faintly acid gastric contents gives rise to a positive tryptophan test, and after some investigation concluded that the saliva contains a peptid-splitting ferment destroyed by boiling, and active in neutral, alkaline and faintly acid media, which is a grave source of error in carrying out the reaction, especially in anacid contents. This observation of a trypsin-like action of saliva is not new, Stadelman having called attention to it many years ago. However, this author strongly suspected that the action was due to bacteria contained in the saliva rather than to any inherent property of the saliva itself; and those more recent writers who, stimulated by Warfield's paper, have reinvestigated the subject, have rather firmly established this view of the bacterial nature of the ferment. Just how frequently the swallowed bacteria give rise to error is a matter of doubt. Most of the authors believe they are seldom a factor. Weinstein says they never give rise to error.

A more serious source of error in the glycytryptophan reaction or its modification is the possibility of the presence of trypsin in the stomach contents. There are few among those who have written on the subject, who do not strongly suspect that many or most of the positive reactions obtained are due to the presence of regurgitated trypsin in the stomach contents. There are several facts which make such a conclusion highly probable. In the first place, most of the positive reactions reported occur in those instances in which trypsin, if it has been regurgitated, would find conditions most suited for its action, *i. e.*, in stomachs with a low or zero acidity. Carcinomatous stomachs usually show a low acid content. The low acid rather than the carcinoma may favor the reaction. Those positive reactions reported in non-malignant cases were on the average strikingly of the low acidity type. Then again, such a result as that reported by Ehrenberg is highly suggestive; of 9 carcinoma cases, 4 gave positive reactions, 5 were negative, the negative cases were all *retentionsfælle*. Did the pyloric obstruction prevent the regurgitation of trypsin in these 5 cases and give rise to the negative reaction? Furthermore, the question of fat digestion in the stomach would seem to throw much light on this phase of the subject. Volhard, some years ago, took the stand that the stomach possessed a fat-splitting ferment of its own. He was led, in great part, to this stand by the undoubted demonstration of such a function in the stomach of dogs. But in man, after observing that fat-splitting took place in many totally achylic stomachs, he was forced to conclude, in a later publication, that in these cases at least the action was due to regurgitated pancreatic juice. In 22 cases of achylia, in which trypsin was tested for, it was absent in only 9. "This fact," says Volhard, "will have to be remembered in the tryptophan reaction." The ease with which pancreatic juice may be obtained in the stomach after an oil meal is again suggestive of the readiness with which regurgitation

takes place from the duodenum. Strauss and Leva have likewise noticed rather constant fat-splitting in the stomach.

It will thus be seen that there are rather potent theoretical objections to be urged against the accuracy of the reaction in its present forms. Nor does it fare better in practice. Most of the reports assign it no diagnostic worth; some of them say it is confirmatory or suggestive, but not even the most optimistic claim that it is of value in early gastric cancer. Whether some further modifications of the test will meet with better success remains to be seen.

PREVALENCE OF TRACHOMA IN THE UNITED STATES.

A REVIEW OF RECENT LITERATURE.

By JOHN GREEN, JR., M. D., of the Editorial Staff.

1. Brown: Trachoma. (*New York Med. Journ.*, p. 608, April 1st, 1911.)
2. Green, Jr.: Prevalence of Trachoma in Missouri. (*Journ. Missouri State Med. Assoc.*, July, 1912.)
3. McMullen: Trachoma in Kentucky. (*Public Health and Marine Hospital Reports*, 1912.)
4. Schereschewsky: Trachoma. (*Public Health and Marine Hospital Reports*, 1907.)
5. White and Treibley: Brochure on Trachoma. (*Ophthalmic Record*, May, 1912.)
6. Wilder: Prevalence of Trachoma in Illinois. (*Ophthalmic Record*, November, 1901.)

It is impossible, at the present time, to arrive at a complete knowledge of the prevalence of trachoma in the United States, for the reason that as yet no general survey of the incidence of this disease has been undertaken in this country. Even if such a general investigation were to be undertaken, it is extremely unlikely that it would yield accurate results. And the prime obstacle in the path of the investigator would be the fact that, with rare exceptions, Boards of Health, whether town, city or state, have failed to appreciate that trachoma is a dangerous contagious disease, and hence have not included it in the list of reportable maladies.

It is the opinion of Schereschewsky that "in the United States trachoma has not as yet become general in its distribution. Owing to the great tide of immigration in this country, we find it rather frequent along the Atlantic seaboard. Owing to westward migratory movements, we also find trachoma prevalent to a certain degree among the inhabitants of the West. It has also been endemic for a number of years in certain restricted areas of Southern Illinois, in the mountains of Kentucky, and West Virginia."

Brown states that in New York City, prior to 1897, trachoma constituted 4 per cent. in over half a million subjects with contagious diseases; three years later (trachoma having, in the meantime, been classified as a 'dangerous contagious' disease by the immigration authorities, thus compelling the deportation of aliens so afflicted) only a little over 2 per cent. were seen in 100,000 cases of contagious diseases. Although New York City probably has the greatest number of cases of any one focus, the disease is on the decline when the increase in population is taken into account. The New York Municipal Bureau of Health recorded something like 10,435 cases of trachoma in 1908, while in 1909 the number reported was 7,090.

Additional evidence of the decline of trachoma in New York City is found from the results of school inspection; in 1902, 20 per cent. of school children had trachoma; in 1908, 7 per cent.; and in 1910, only 3 per cent.

Information from Baltimore, Cleveland and Philadelphia indicates that the disease in these cities is on the decline. In Toledo and Akron, Ohio, it is on the increase. In Dayton, Ohio, it is said to be assuming alarming proportions. In Chicago, the disease is stationary.

It should be noted that the increase is especially noticeable in smaller towns and cities which do not seem to be able to put in force the procedures that would insure prompt eradication.

Figures from the Wills Eye Hospital clearly indicate the decrease of the disease; in 1872 the percentage was 5.9; in 1908, 0.7 per cent. Not only has the incidence of the disease diminished, but it has, to a great extent, lost its virulence.

The disease is very prevalent in Southern Illinois and to some extent throughout the rest of the State (Wilder).

Northern Arkansas is seriously infected. The following excerpt from the Twenty-first Biennial Report of the Arkansas School for the Blind indicates how serious is the menace to sight from trachoma in that state: "The condition in Arkansas shows a larger proportion of pupils in school with trachoma than from all other causes, and a larger per cent. than is shown to exist in other states. The Northeastern and Northwestern portions of the state constitute the principal areas of infection. The Eastern and Southern portions are almost entirely free as far as shown by our records. In the Arkansas school the number of pupils enrolled in 1908-10 was 199 white, and 28 colored. The number of cases of trachoma and blindness caused from trachoma was 115."

The Committee on Trachoma Investigation of the Missouri State Medical Association (1912) concluded that there were not less than 10,000 sufferers from trachoma in Missouri.

Dr. J. A. Stucky, of Lexington, Ky., who recently made a journey into the heart of the mountain regions of Eastern Kentucky, makes the following report: "I found that in families where there were children it was an exception to find only one case of diseased eyes. In one instance, seven out of the nine children were unable to attend school on account of trachoma. Such cases as these are not allowed to attend our schools, and yet in the mountains they are not considered infectious or dangerous, but just 'sore' eyes. A solution to the problem in the mountains is the same as in the state—the question of education. Many of these who need surgical treatment and hospital care have not the financial means to obtain these. The country in which they live contains no institution where they can be cared for without personal expense, and the county treasury contains no funds to provide for even the hospital care elsewhere."

Conditions in these mountain regions prompted the United States Health Service to send a special investigator (McMullen), in the summer of 1912, to endeavor to secure exact data. His survey which included seven counties in the mountain regions of Eastern Kentucky revealed an appalling prevalence of the disease. Of 3,974 individuals selected at random, 500 or 12.5 per cent. were affected. 338 out of 2,796 school children examined had trachoma (12 per cent.). In Knott, Perry, Leslie and Breathitt counties, out of a total population of 50,000, McMullen estimated that there were 3,400 victims of trachoma. These

people are very poor, live crowded in wretched hovels without proper light or ventilation, and have no conception of ordinary rules of sanitation—conditions which conspire to disseminate the disease.

White and Treibley estimate in Oklahoma that, out of a total Indian population of 100,000, about 65,000 are sufferers from trachoma. These authors state that the disease is "very prevalent in Illinois, Missouri, Oklahoma, Arkansas and Texas." Dr. White found that 48 per cent. of the white children in the Pawnee Public Schools were affected, and his examination in other white schools throughout the state justifies the assertion that from 20-40 per cent. of all the white school children of Oklahoma are trachomatous.

The following remedial measures are suggested:—

1. Trachoma should be made a reportable disease to every local Board of Health.
2. Local Boards of Health and health commissioners should regard trachoma with the same concern that they regard scarlet fever, diphtheria, and typhoid fever. Trachoma may not be dangerous to life, but it is dangerous to that which is almost as precious as life itself—eyesight. The failure to recognize trachoma as a serious contagious disease is reprehensible.
3. State Boards of Health should require a tabulation of all fresh cases of trachoma.
4. The Federal Government should provide measures for the investigation of trachoma throughout the United States, and where it is found to exist measures should be taken in conjunction with the local authorities for its control.
5. Boards of Education must be roused to a more intelligent attitude towards this disease. The opposition to medical inspection in the public schools must be abandoned if the eyes and eyesight of the coming generation are to be safeguarded.
6. Education of the people in the true nature and possible danger of this disease by talks with the family physician, public lectures by oculists, the distribution of pamphlets and books issued by the local public libraries, should be insisted upon.
7. Special stress should be laid on the danger of contagion and the familiar character of the disease. Epidemics in institutions should be guarded against by periodical ocular inspection of all the inmates.
8. In localities where trachoma is endemic, hospitals should supply a few beds in a ward for trachoma patients who require intensive treatment or operation.
9. Practitioners in the country should equip themselves to recognize incipient trachoma and to apply the simpler medical and surgical measures for its relief. Whenever possible, the patient, even in the incipient stage, should be referred to an oculist.
10. Trachoma with complications, *e. g.*, pannus, ulcer, entropion, iritis, etc., should under all circumstances be treated by an oculist.

RECENT ADVANCES IN CANCER RESEARCH.

A REVIEW OF RECENT LITERATURE.

By MOYER S. FLEISHER, M. D., of St. Louis.

1. Woglom (*Journ. Exper. Med.*, Vol. XVI, p. 629, 1912).
2. Meidner (*Zeitschr. fuer Krebsforsch.*, Vol. II, p. 415, 1912).
3. Uhlenhuth, Hændel and Steffenhagen (*Zeitschr. fuer Immunitätsforsch.*, No. 6, p. 654, 1910).
4. Apolant (*Zeitschr. fuer Immunitätsforsch.*, No. 10, p. 103, 1911).
5. Russell (*Fifth Scientific Report Imperial Cancer Research Fund*, Part I, 1912).
6. Loeb (*Zentralbl. fuer Bakt.*, No. 63, p. 450, 1912).

The exact nature of immunity to inoculation with tumors in animals used in experimental work, concerning cancer, is far from being known or even partially understood. Indeed, the limits of this immunity, as well as the factors producing it, are apparently as yet not clear.

Woglom has attempted to study the immunity produced by injection of embryonic tissue into mice in relation to time. That is, he has determined the earliest appearance of the immunity and the length of time after the injection that the immunity still persists. He compared the resistance to inoculation with tumor material produced by the previous injection of embryo skin, with that produced by the injection of tumor material which did not grow (usually using pieces of spontaneous tumors which, in the large majority of cases, will not grow in normal mice), or the injection of kidney material. He noted first that embryo skin produced a greater degree of resistance to the subsequent inoculation with tumor material than did non-growing tumor material, and this latter material acted more strongly than did kidney material.

The curve of the development of the resistance following the injections of these materials was similar for the three. If the growing tumor material be inoculated on the third day after the injection of the immunizing material, little or no effect is apparent; by the fifth day, however, a very marked effect is apparent, and the percentage of growing tumors is very materially decreased. This immunizing effect seems to reach its maximum about the tenth day, and from then on gradually diminishes until, about eighty days after the injection, the animals are again as susceptible to inoculation as normal untreated mice.

Woglom further found, when he first inoculated a good growing tumor, allowed it to grow to a considerable size, and then removed it completely and inoculated a different good growing tumor on the following day, that the latter did not grow. Apparently the growth of the first tumor has produced an immunity similar to that produced by the injection of embryonic tissue. When these same mice were inoculated with a third good tumor eighty days after the beginning of the experiment, evidence of resistance to inoculations was no longer noted. It would, therefore, appear that the

immunity produced by the injection of tumors which do not grow in the injected animal and the immunity produced by the growth of a tumor are at least in part similar.

Meidner has also investigated some phases of this latter question—namely, the influence exerted by the complete removal of a growing tumor upon the susceptibility of the animal to later inoculation. This question had been investigated some two years ago by Uhlenhuth, Hændel and Steffenhagen, who noted while using a rat tumor that when a tumor was completely removed, a second inoculation was not successful, but when the removal had not been complete and the tumor recurred, it was possible successfully to reinoculate the rats. Apolant reviewed the work of these first three investigators, but reached rather different conclusions and noted different results: a large percentage of the animals in which the tumor was completely removed was susceptible to a second inoculation. Apolant further found that even when the first was not entirely removed, there was frequently no recurrence; thus pieces of the first tumor would be resorbed and might produce immunity. Therefore Apolant did not believe that there was any definite relation between the removal of the first tumor and the susceptibility to inoculation with a second tumor. And again he considered that the burning out of the wound, to which Uhlenhuth, Hændel and Steffenhagen subjected their animals in order completely to eradicate the first tumor, or the mere trauma of the operative interference, might have some effect in producing immunity.

Meidner, who in his experiments used several rat sarcomata, found that, after a radical removal of the first tumor, the inoculation of the second tumor was successful only in a very small percentage of the animals; only in a little over 6 per cent. of the animals so treated did the second tumor grow, although the same tumor grew in about 80 per cent. of normal animals in which no tumor had been growing previously. In cases in which the removal of the first tumor was not complete but the recurrence was gradually resorbed, the second tumor began to grow only in a small number of animals, and in most cases the second tumor was also resorbed *pari passu* with the recurrence. In those cases in which the first tumor recurred after the operation and the recurrence grew actively, the inoculation of a second tumor was usually successful. Thus Meidner has apparently found similar results regarding the influence of the complete successful removal of a tumor upon the susceptibility to a second inoculation in the same way as Uhlenhuth. (It should be stated that the objection which Apolant raises against the experiments of Uhlenhuth and his collaborators, regarding the possible effect of the burning out of the site of the first tumor, does not hold in the case of Meidner's experiments.) In general there is considerable similarity between the results of Meidner and Uhlenhuth in the cases of animals in which the tumor recurred, although some minor differences were noted. In the main, however, the animals in which there was no recurrence seem to be resistant to a second inoculation, while those in which there was a recurrence were susceptible.

Apolant further believed that in many cases in the course of the operation small pieces of the tumor, loosened from their blood-supply, might have been left in the wound, and that the absorption of these pieces might have produced the immunity which was noted after the removal of a tumor. Thus only in the cases in which the second inoculation was successful could it be said that the operation had been complete. Meidner finds, however, that usually in cases in which there was no recurrence, the second piece of tumor did not even begin to grow, while in the cases

in which the first tumor began to grow again after the operation, only later to retrogress, the second tumor, as a rule, also began to grow. Had small pieces of tumor been left in the wound and had immunity been produced through the absorption of these pieces, the second tumor should have started to grow; and at the time of the second inoculation the immunity produced by the absorption of the loosened pieces of the first tumor would probably not have been complete. Since, however, in Meidner's experiments the second tumor usually did not even start to grow in animals free from recurrences, it would seem that this explanation of Apolant does not hold. Furthermore, this argument is rather a negative argument and apparently hypercritical.

Uhlenhuth has advanced the theory that, during the growth of the first tumor, antibodies are produced which act upon the second piece of tumor; that, when there is a recurrence, the action of these antibodies is divided between the two tumors—the recurrence and the second tumor—and since the action is not concentrated upon the second tumor it has an opportunity to grow; that when, however, the first tumor is entirely removed the antibodies can act entirely upon the second tumor and now destroy it or prevent its growth. Apolant has attacked this theory, but in view of the fact that Meidner's results do not agree with those of Apolant—and it was partially on a basis of the difference of results that the latter had attacked Uhlenhuth's theory—the actual reasons for the apparent immunity produced by the complete removal of a growing tumor cannot at present be determined. Meidner offers no explanation, but only states the facts of his experiments.

It seems that certain factors, which none of these investigators took into account, may have influenced their results, and may at least in part account for the differences. It may be of interest to state here, that somewhat similar differences in the influences resulting from the complete removal of a tumor, followed by the inoculation of a second tumor, have been noted previously, to wit, Schöene, who removed a rapidly growing tumor from mice, found that in all cases a tumor, inoculated following this operation, grew successfully; Sticker found similar results in the case of a lymphosarcoma of the dog; on the other hand, Gay found that when a tumor was removed from rats, a second tumor did not grow unless inoculated thirty days after the first tumor had been inoculated. In partial explanation of this fact it should be stated that the tumor used in Gay's experiments was one which metastasized in the majority of cases and which seemed to form metastases only after a period about thirty days after inoculation. From these results it becomes evident that the mechanism which is active in producing immunity to a second inoculation with tumor, after the removal of the first tumor, is a rather complex one, the probability suggested being that in different tumors the effect is different. The degree of virulence—namely, the rapidity of growth, the percentage of takes and of growing tumors, and the percentage of retrogressions may influence the degree of immunity produced by a tumor; and the degree of virulence of the tumors used by these various investigators may have been and probably was different, so that they were each dealing with a different set of factors, denying the results of one another when they were each working on entirely different bases, and with widely different materials.

That different results are obtained with different tumors has been demonstrated by the experiments of Russell. He first found that when he used for the first inoculation a very rapidly growing tumor which also

grew in almost all the animals inoculated, the removal of the first tumor did not influence the growth of the second tumor when in the latter a tumor was used which grew in the large majority of the inoculated animals. When, however, a more slowly growing tumor, which did not grow in so large a percentage of the inoculated animals and which also showed a tendency to retrogress spontaneously, was used for the first inoculation, the immunizing influence of the tumor became more apparent, and in a very much smaller percentage of the animals did the second tumor grow, although a good growing tumor was used. Finally, when a tumor was used for the first inoculation, which showed a very marked tendency to retrogression, in which, in fact, most, if not all, of the tumors retrogress at a very definite period after the inoculation, it was found that in no case did a second tumor grow after the first tumor had been completely removed. A series of experiments were also carried out with a strain of a rat sarcoma (all the preceding experiments of Russell had been carried out with tumors of mice); and in this experiment in which the first tumor used was a very rapidly growing one and one which grew in almost all the animals inoculated, the second tumor grew in all animals. Russell believes that the tissues inoculated are the factors which determine whether or not the animals will be refractive to a second inoculation, and that those which influence the injected animals to the extent that a second inoculation is not successful would be classed as efficient antigens—to use the nomenclature of modern immunity studies. He, however, does not believe that, in the summing up of the results, the individual can be entirely left out of consideration; for, in those cases in which almost all the animals grew tumors after the removal of a first tumor, we find one or two in which the second tumor did not grow, and also in those cases in which, in a large percentage, the second tumor did not grow, we must in some manner explain why the resistance to the second inoculation was not apparent in all cases. Russell believes that the reaction of the individual may account for the exceptions to the general rule. He found that the removal of the tumor was not the factor which was active in the production of the immunity; but that even if the first tumor was not removed the reaction of the animal to a second inoculation was the same. Thus in mice, which were first inoculated with a tumor which seemed after removal to prevent the growth of a second tumor, a second tumor did not grow when inoculated at the same time that the first tumor was still growing; and in those cases in which mice were inoculated with a tumor which did not, after removal, prevent the growth of a second tumor, it was found that a second tumor would grow at the same time that the first was growing. In these last mentioned experiments the second tumor was inoculated at some period after the first. Russell also carried out some experiments in which he inoculated simultaneously a tumor which did not produce immunity and one which did produce immunity (the former being a rather poorly growing tumor and the latter a good growing tumor). He found in this case that the influence of the tumor which did produce immunity was evident even in these experiments, and that the percentage of growth of the good growing tumor was materially diminished. It is evident, therefore, that the conditions which the previously mentioned investigators have observed are not dependent upon the removal of the first tumor, or the recurrence or non-recurrence of the same, but are dependent only upon the growth of the first tumor. The conditions which develop within the body of the inoculated host, as a result of the growth of the first tumor, determine the success of the graft of the second tumor.

Russell suggests that certain tumors on transplantation lose their power of inducing resistance, and that it is the gradual loss of this power which causes the rather rapid rise in the percentage of successful takes in the first few transplantations of a spontaneous tumor in normal mice. It does not seem that these conclusions are justifiable, and it seems quite as likely, as had been suggested by Loeb more than ten years ago, that the increase in the adaptability of the spontaneous tumor to transplantation, noted during the first few generations, is due at least in part to the stimulus of the handling which it is subjected to in the course of the removal from, and the inoculation into animals.

Furthermore, it has been shown by Loeb that similar varying degrees of immunizing powers can be produced in one tumor by treating that tumor in certain ways. By heating a tumor to 44° C. for varying periods of time, the virulence—referring here as already stated to the rate of growth, percentage of growth and retrogression—can be influenced at will.

By this means, Loeb had at his disposal tumor material of various degrees of virulence, and by inoculating the tumors of different degrees of virulence he was able to observe the various types of immunity.

It appears from Loeb's experiment that Russell has not considered the influence of one factor which is also of considerable importance—namely, the degree of virulence of the tumor used at the second inoculation. Russell always used, for the second inoculation, a tumor which was of a high degree of virulence. In Loeb's experiments it was shown that the first inoculation of a virulent tumor did not interfere with the growth of a second virulent tumor, but that when a virulent tumor was inoculated first and a tumor of markedly diminished virulence second, this latter tumor did not grow as well as in normal control animals. As the degree of virulence of the second tumor was gradually diminished, the interference with its growth by the primary inoculation of a virulent tumor became more and more evident, until finally the very slightly virulent second tumor did not grow at all.

This latter type of growth, Loeb terms the exclusive type of growth. A second type of growth—namely, concomitant, is represented in the cases in which either two virulent tumors were inoculated or two tumors with moderately diminished virulence, or finally when the first tumor had a low degree of virulence and the second a moderate degree of virulence. The concomitant type of growth gradually passed into the exclusive type, when, as already stated, the first tumor was virulent and the degree of virulence of the second tumor was gradually diminished. A third type of growth in double inoculations was noted when tumors of low degree of virulence were used both for the first and second inoculation. Here it was noted that both tumors did not grow, but that only the first or only the second would grow; very rarely did both the first and second tumors grow in the same animals. This type was called the mutually exclusive type. Finally it appeared that there existed possibly a fourth type of growth, which was noted when a tumor of low virulence was inoculated first and one of moderate virulence second; under such conditions it appeared possible that the growth of the tumor of low virulence was beneficially influenced by the growth of the second tumor. Loeb does not, however, state definitely that this type does exist, and for the present withholds a final statement.

It may thus be seen that the factors, concerned in the immunity produced by the preliminary inoculation of a tumor against inoculation of a second tumor, depend not only upon the virulence and growth-energy of the first and the second tumors, but also upon the relative virulence of these two.

SOME RECENT ADVANCES IN THE DIAGNOSIS OF GASTRIC DISEASE.

A REVIEW OF RECENT LITERATURE.

By IRVING F. STEIN, B. S., M. D., of Chicago.

1. Roberts (*Journ. Amer. Med. Assoc.*, Vol. LVIII, p. 753, 1912).
2. Friedman (*Archives Int. Med.*, Vol. IV, p. 69, 1909).
3. Mattisson (*Archiv fuer Verdauungskrank.*, Vol. XIX, p. 79, 1913).
4. Friedrich (*Berl. klin. Wochenschr.*, p. 32, January, 1913).
5. Boas (*Deutsch. med. Wochenschr.*, Vol. II, p. 62, 1911).
6. Boas (*Deutsch. med. Wochenschr.*, Vol. XXXVII, p. 2277, 1911).
7. Zugsmith (*Penn. Med. Journ.*, Vol. XV, p. 436, 1911-12).
8. Rovsing (*Annals of Surg.*, Vol. LVI, p. 201, 1912).
9. Souttar and Thompson (*British Med. Journ.*, p. 843, 1909).
10. Elsner (*Berl. klin. Wochenschr.*, Vol. XLVIII, p. 4, 1911).
11. Elsner (*Verhandl. der Berl. med. Gesellsch.*, Vol. XLI, p. 300, 1911).
12. Neubauer and Fischer (*Deutsch. Archiv fuer klin. Med.*, Vol. XCVI, p. 499, 1909; *ibid.*, Vol. XCII, p. 5, 1910).
13. Lyle and Kober (*New York Med. Journ.*, Vol. XCI, p. 1151, 1910).
14. Hamburger (*Journ. Amer. Med. Assoc.*, Vol. LIX, p. 847, 1912).
15. Smithies (*Arch. Int. Med.*, Vol. X, p. 357, 1912).
16. Smithies (*Journ. Amer. Med. Assoc.*, Vol. LVIII, p. 1008, 1912).
17. Haudek (*Archives Roent. Ray*, Vol. XVII, p. 312, 1912-13).
18. Haudek (*Wien klin. Wochenschr.*, Vol. XXV, p. 67, 1912).
19. Holzknecht (*Archives Roent. Ray*, Vol. CXLIV, p. 59, 1912; *ibid.*, Vol. XVI, p. 206, 1911-12; *ibid.*, Vol. CXLVII, p. 192, 1912).
20. Cole (*Archives Roent. Ray*, Vol. CXLVII, p. 172, 1912).
21. Cole (*Journ. Amer. Med. Assoc.*, Vol. LIX, p. 1947, 1912).
22. Cole (*Trans. Amer. Assoc. Obstet. and Gynec.*, Vol. XXIV, p. 288, 1912).
23. Pfahler (*Penn. Med. Journ.*, Vol. XV, p. 432, 1911-12).
24. Case (*Archives Roent. Ray*, Vol. CXLIV, p. 46, 1912).
25. Kayser (*Deutsch. med. Wochenschr.*, Vol. XXXVIII, p. 551, 1912).
26. Ehrenreich (*Berl. klin. Wochenschr.*, Vol. XVI, p. 734, 1913).
27. Aubourg (*Le Bull. Méd. de Quebec*, July, 1911).

This report does not pretend to cover all the literature on work done in recent years upon the diagnosis of stomach diseases, but will take up some of that work under the following heads:—

- I. A few miscellaneous reports on new test meals, acidity tests, etc.
- II. Gastroscopy.
- III. The chemical tests for carcinoma of the stomach.
- IV. The Roentgen ray in the diagnosis of gastric disease.
- I. Due to the fact that but limited information is obtainable from the

Ewald test breakfast, many suggestions have been made and new meals tried in an effort to gain a more exact knowledge of the secretory and motor power of the stomach.

Sahli described a butyrometric meal—a fat emulsion consisting of 45 gm. of flour and 15 gm. of butter; after roasting, 350 c.cm. water are added and the whole boiled for two minutes. 50 c.cm. of this mixture are retained for fat determination and 300 c.cm. given the patient. Aspiration is done at the end of one hour, and the fat determination made with this and the 50 c.cm. which had been retained.

Friedman states that this method fails because the emulsion is often destroyed. In cases of low acidity with hypermotility, no fluid is left at the end of one hour. In gastritis the mucus destroys the emulsion and obscures the reading in the Babcock by rising to the surface. In greatly impaired motility it is inaccurate because the stomach is not empty when the meal is given.

Roberts describes a 'lactose meal' in which 30 gm. of lactose are given with 300 c.cm. of weak tea and one pilot biscuit or two crackers (without salt, sugar or dextrine). This meal is withdrawn in one hour and then 200 c.cm. water introduced into the stomach, mixed well by pumping in and out and withdrawn. The two samples are kept separated. Free HCl is tested from the first sample as in the Ewald meal. Total acidity is tested from both together. The amount of lactose is tested in the first by Ruedisch and Cellar's method. Many formulæ are used in the final determinations, making it a complicated procedure.

These methods do not seem to improve upon the Ewald meal, and only add more complicated procedures either in preparation of the meal, in the estimation after withdrawal, or both.

Holmgren attempted to simplify the acidity tests by eliminating titration for free HCl. He found that if Congo-red paper be dipped into gastric contents containing free HCl, as the paper becomes wet by capillary attraction a blue zone appears near the line of moisture. This is followed by a zone which is merely wet but not discolored, and which varies in width with the degree of acidity: it is narrow in high, and wide in low, acidity. Holmgren considers this a good quantitative as well as qualitative test.

Mattisson condemns this method—the so-called 'capillary analysis'—stating that figures are variable and unreliable, technique is complicated and difficult, and, further, that we already have methods which are simple, fairly reliable and more accurate.

Friedrich uses a method which does not employ the stomach-tube or pump. Instead of examining aspirated stomach contents, the patient swallows a capsule suspended on a Congo-red string twenty minutes after eating an Ewald meal. The capsule is withdrawn in half an hour, the color of the string determining the acidity. Free HCl turns Congo-red blue, so the greater the amount of free HCl in the stomach the more blue color appears on the string.

A new method for testing for occult blood in the stomach contents—which may also be used with feces—is the phenolphthalein test of Boas. The reagent consists of 2 gm. phenolphthalein, 20 gm. caustic potash, 10 gm. zinc powder, and 100 c.cm. water. This is mixed over the flame until colorless and then filtered while hot. It is used just as guaiac in the Weber test, a pink to red color appearing, depending upon the amount of blood present. In delicacy it is just between the Weber and benzdine tests.

Zugsmith described a new sign in the diagnosis of ulcer and carcinoma of the stomach. This is the presence of an abnormal dullness to percussion in the second interspace on both sides of the sternum. It extends 1 or 2 in. to the right of the normal heart dullness, towards the axilla. It is present both in ulcer and carcinoma of the stomach and disappears after the healing of an ulcer. He ascribes it to enlargement of lymph-glands along the sternum, but this view is not substantiated by post-mortem findings.

II. For the past fifty years or more, physicians have been trying to devise some method of observing the interior of the functioning human stomach. Rovsing described a method of "Direct Duodeno-gastrosocopy and Diaphanoscopy." A crude form of diaphanoscopy was described by Millaud as early as 1867. The instrument described by Rovsing is similar to the Nitze cystoscope, and is used for both gastrosocopy and diaphanoscopy through a gastrotomy wound. If the room be darkened and the stomach dilated with air, gastritis, chronic ulcers, and tumors are easily seen by diaphanoscopy. By gastrosocopy superficial ulcers and especially small bleeding ulcers are seen. The gastroscope can be led through into the duodenum, and its walls observed; if there is difficulty in passage, an obstruction obtains.

Souttar and Thompson constructed a gastroscope which may be introduced through the mouth. It consists of a tube bent at the pharynx and at the cardia, and is used with the patient under general anesthesia. Mirrors placed at the two angles reflect the image to the eye. The stomach can be inflated through the tube and its size thus palpated. In a dark room the powerful light of the gastroscope acts as a transilluminator, and tumors on the anterior wall may thus be seen as shadows on the surface. By means of a revolving nose piece, practically the whole surface of the stomach can be examined.

The authors describe the gastrosocopic appearance of the normal stomach, of ulcer, carcinoma, and hemorrhage.

Elsner's gastroscope is also introduced through the mouth, but his instrument is patterned after the Nitze cystoscope and requires quite as much care and practice to use it intelligently. Elsner has been able to take photographs of the gastric mucosa through his instrument.

Among other gastroscopes described in the literature are the ones of Loenig and Stida, and Sussman, the latter being a flexible gastroscope.

III. Much work has been done recently in an effort to make an early diagnosis of carcinoma of the stomach, and perhaps the greatest strides have been made along chemical lines. Chief among these, which will be mentioned briefly, are the tryptophan and the glycytryptophan tests.

In 1909 Neubauer and Fischer reported that peptidolytic enzymes are formed in the stomach by certain malignant growths. This ferment, unlike pepsin, splits glycytryptophan; the tryptophan formed by this hydrolysis is recognized by a pink color upon the addition of bromine. They found that the ferment is destroyed by 36 per cent. HCl. Their conclusion is that the presence of this ferment in the stomach is of diagnostic importance in carcinoma. Lyle and Kober, Hamburger, Smithies and others agree that the test depends upon the fact that digestion is carried farther in a carcinomatous stomach due to the presence of an enzyme analogous to trypsin in action. Errors in results are due to the presence of tryptophan, blood, pepsin, peptid-splitting bacteria, and free HCl in the stomach contents.

Smithies, of Rochester, Minn., contends that the early diagnosis of

carcinoma still depends upon the microscopical examination after laparotomy.

Weinstein claims that the presence of tryptophan in the stomach contents is pathognomonic of carcinoma. Smithies, on the other hand, found that in 87 cases of cancer of the stomach, 31 gave a positive glycytryptophan and only 7 positive tryptophan tests. The diagnosis of cancer was possible in all these cases independent of these tests. The glycytryptophan was positive more often than lactic acid, and five times as often as the tryptophan test. The glycytryptophan test is positive in other gastric conditions, but not so consistently as in cancer. Smithies concludes that the tryptophan test is not pathognomonic of cancer. Boas states that the chemical tests for carcinoma, while aiding in the differential diagnosis, do not aid in the early diagnosis. Kayser is of the same opinion, but goes so far as to state that all cases positive by the glycytryptophan test, when substantiated by *x*-ray findings, may be considered carcinoma.

IV. Perhaps the greatest advance in diagnosis of stomach conditions has been made by the uses of the Roentgen ray. The fluoroscope is by far the most important in this work, but the detail obtained in instantaneous radiographs is invaluable in the differential diagnosis, especially of carcinoma and callous ulcer. Haudek says that the Roentgen ray does away with the exploratory laparotomy in inoperable carcinoma and gives definite indication for laparotomy. In *x*-ray work on the stomach, a Rieder meal is usually employed; this consists of 50 gm. bismuth in 350 gm. gruel or broth. With the fluoroscope one can see the passage of the bismuth through the cardia, the form, size, position, motility (active and passive) and contour of the stomach, the form of the air-bubble, peristalsis, work of the antrum, the entrance of the bismuth into the duodenum, the tonus of the walls, the amount of secretion, and the time taken for the stomach to empty itself.

Schlesinger determines the amount of secretion after a Rieder meal by the intermediate layer between the bismuth and the air-bubble, which he claims is formed by the gastric juice. The relative amount of free HCl can be determined by giving sodium bicarbonate and noting the increase in size of the air-bubble.

Bismuth meals should be made palatable so as to excite the normal gastric secretion. Schwartz introduced a fibroderm-pepsin capsule which should be digested in the normal stomach in five hours. Its presence in the stomach after five hours is, according to Holzknecht, diagnostic of achylia gastrica.

Kæstel described the use of two capsules containing bismuth, one heavy and one light (containing air) which Holzknecht and Fujinami used to determine parasecretion of the stomach. When the stomach is empty—as in achylia—the capsules are seen to lie side by side, and when secretion is in the stomach, the light one floats while the heavy one remains low. As little as 30 c.cm. of fluid in the stomach will show by this method.

Probably the most extensively used of all methods in Roentgen diagnosis is Haudek's double meal. A Rieder meal is given and at the end of six hours the motile power of the stomach determined by the amount of residue; then the meal is repeated and observations, made immediately, determine the form, size, position, etc.

The normal stomach, according to Schlesinger, may have any of four different forms, depending upon its tone. These he calls hypertonic, orthotonic, hypotonic, atonic.

He states, however, that these forms may pass into the next during digestion.

According to Holzknecht, the normal stomach is full up to the cardia independent of the amount of its contents, and the lowest portion of the fundus is at the level of the umbilicus.

The types of stomach seen radiographically, according to Cole, are the textbook, fishhook, cow-horn, drain-trap, saddle-shaped, and deformed. The chief abnormal conditions recognized by roentgenograms are ulcer, carcinoma, and atony, and less often hour-glass contraction and adhesions.

Simple gastric ulcer is usually detected by a deep furrow in the greater curvature, but, according to Holzknecht, only a callous ulcer on the lesser curvature gives this indentation. The simple, flat ulcer is not readily recognized. The latter authority states that modern stomach diagnosis is made by the history, palpation, and the Roentgen ray, aided, of course, by the acidity tests. He gives the diagnostic findings in the various types of ulcer, carcinoma and the normal stomach after the Rieder meal.

The snail-form stomach, according to Smieden and Hertel, Holzknecht, and others, points to an ulcer on the lesser curvature; this, however, is refuted by De Quervain.

Haudek holds that a diverticulum-like shadow is given in callous ulcer; if this is capped by an air-bubble it points to perforating ulcer.

A large sickle-shaped residue (after six hours) is described by Holzknecht in old ulcer with stenosis; if this is associated with a marked defect in filling the pars pylorica, it is a carcinoma at the base of an old ulcer with stenosis.

No attempt will be made here to describe all the conditions recognized by the *x*-ray, but some of the work on carcinoma is surely worthy of a few words.

Pfahler says that the diagnosis can positively be made in every case of indurating carcinoma. Carcinoma modifies the outline, position, or lumen of the stomach, and interferes with peristaltic waves, or obstructs the passage of food from the stomach. The earliest evidence is some interference with the peristaltic waves; and in pyloric obstruction, antiperistalsis is seen. According to Haudek, gastric antiperistalsis is always associated with a pathological lesion of the wall of the stomach or duodenum, and is most frequently seen in stenosis. It consists in the passage of waves of contraction in a reverse direction, and only occurs in stomachs of normal or hypotonicity. Holzknecht says it means a serious anatomical lesion, but is not pathognomonic of stenosis, it having been observed in gastric crises. In explanation of antiperistalsis, Nothnagel states it is due to a chemical stimulus acting upon an unphysiological situation, while Hofmeister and Schuetz claim it is due to the lack of proportion between the lumen of the pylorus and the contents of the antrum.

Authorities are united in the opinion that when the hook-shape of the stomach is preserved in a case of carcinoma, the case is an operable one, and that the horn-shape means inoperability.

A scirrhus carcinoma usually gives the picture of a small contracted stomach situated high, in which no peristalsis is seen. In these cases the hook-form is usually absent.

Fungus and medullary forms give serrated boundaries like fingerprints, or, when the whole pylorus is absent, the bismuth is seen to appear in the duodenum over the carcinoma distance. Again, a fine card-like shadow may bridge the distance when a prepyloric cancer only involves part of the circumference. Growths on the anterior and posterior walls may not show in ordinary pictures.

The real value of the Roentgen ray lies in the differential diagnosis between ulcer and carcinoma. It, however, is often only an aid to the clinical data. In other conditions, such as hour-glass contraction, adhesions, tumors pressing from without, etc., much valuable information may be gained.

A little different from the usual roentgenoscopy and roentgenography is notably the work of Case, of Battle Creek, Mich., and of Cole, of New York.

Cole has been working for the past few years on what he terms 'serial radiography.' He claims that numerous instantaneous radiographs of various phases of different cycles of the stomach are of more diagnostic value than various phases of the same cycle. He states that, except in extreme cases of carcinoma, the diagnosis of the condition of the walls of the stomach and duodenum can only be made by serial radiography or cinematography. Cole claims that by serial radiography the differential diagnosis between carcinoma, hour-glass contraction, adhesions from gastric ulcer, duodenal ulcer, or gall-bladder infection, with or without stones, dilatation from atony or obstruction, and atrophic contraction can be made as accurately as the surgeon can make it macroscopically at an exploratory laparotomy. He questions the value of fluoroscopy and the study of single radiograms.

Case has reported work on stereo-roentgenography of the gastro-intestinal tract. The first work published along this line was by Leonard, of Philadelphia. Stereograms are taken by means of Hildebrand's tunnel-changing plate holder, the region being held immobile while the bulb is displaced transversely 6 cm. Pictures, of course, are taken very rapidly. This method cannot replace roentgenoscopy, but the true perspective given is an aid more valuable than information derived from flat radiograms.

DIAGNOSTIC AND THERAPEUTIC NOTES.

CHRONIC SPASTIC CONSTIPATION.—v. Noorden (*Zeitschr. fuer klin. Med.*, Vol. 76, Nos. 5 and 6). In connection with the description of a specially severe case, the writer discusses the characteristic symptoms of spastic constipation. Chronic constipation alternates with periods of diarrhea. There are attacks of intense abdominal pain, often with vomiting, that cease when the colon has been thoroughly emptied. During the attacks the patient's condition may suggest peritonitis. There is diffuse abdominal pain and tenderness, a small rapid pulse, marked meteorism, especially over the ascending colon, with dullness over the splenic region and descending colon. The diagnosis is made with greatest certainty by means of the radiograph: The double rosette-like chains at the splenic flexure and the marbled appearance characteristic of ulcerative colitis.

In the earlier cases, a proper therapy produces prompt results. All purgatives are strictly contraindicated. Atropine must be given in physiological doses and after a period of bland and very concentrated food; the latter must gradually be replaced by a coarser diet, more and more rich in cellulose but with ample nutritive elements. This is the critical stage. If the patient bears the coarse diet well, a complete cure may be expected. If the change to a coarse diet leads to a recurrence of the colicky attacks, we must infer that the ulcerations have led to adhesions and strictures too severe for internal treatment. The case must then be referred to the surgeon.

THE 'THIGH SYMPTOM' IN CEREBRAL DISEASE.—Heiniss (*Wien. med. Wochenschr.*, No. 5, 1913). The writer describes a new reflex. If a moderately intense pressure be exerted over a point on the inner aspect of either or both thighs, corresponding to the site of the canalis adductorius, an expression of pain or a rapid defensive motion indicates a positive reaction. The writer found the symptoms nearly constantly positive in all cases of cerebral or meningeal disease. It was most constant and most marked in cases of tuberculous meningitis, during the entire course of the disease, but especially in the initial stage. As an early sign, it may prove of considerable value.

HAND DISINFECTION.—Ahlfeld (*Beitr. zur klin. Chir.*, No. 1, 1913). The frequency with which rubber gloves are torn (33 per cent. of all obstetrical cases) renders a sterilization of the hands imperative. The general belief, at present, is that complete cutaneous asepsis, especially in the deeper layers, is impossible. With this view, however, Ahlfeld is inclined to take issue, believing that his hot-water-alcohol method produces a practically complete sterilization of the hands. At any rate, an hour

and a half after being incased in rubber gloves, the surface of the skin of the hands is still sterile, no micro-organisms having been set free from the deeper layers.

His technique is as follows: A preliminary scrubbing with soap and hot water, trimming of the nails, scraping of the nail beds, rinsing in clean water and drying, is followed by a thorough scrubbing with soap, brush and hot water. The hands are then immersed in 80-90 per cent. alcohol if they have been dried, or in 96 per cent. alcohol if still wet. For three minutes they are scrubbed with a sterile brush, which has lain in alcohol, and are then rubbed and polished with a soft, sterile, flannel cloth for another three minutes. He hopes that an investigation may be undertaken to determine whether hands so treated may not be sufficiently aseptic to justify the abandonment of rubber gloves. At any rate, he believes that this method at present offers the nearest approach to a real asepsis of the hands.

TUBERCULIN THERAPY IN THE SURGICAL TUBERCULOSIS OF CHILDHOOD.—Førster (*Beitr. zur Klin. der Tuberk.*, Vol. 25, No. 1). When he first began the use of tuberculin in the tuberculous surgical affections of childhood, the writer had attempted, so far as possible, to avoid all reactions. He has found, however, that the best results are obtained from doses that produce a slight local reaction at the site of injection, but just fail to produce a general reaction. He begins with a millionth of a milligram of old tuberculin and increases the dose as rapidly as an avoidance of a general reaction permits. He has found that the best results are obtained in cases that develop a hypersensitiveness to tuberculin; here his results were very good. In cases in which the clinical manifestations are acute, even the smallest doses of tuberculin must be used with caution.

AUTOSEROTHERAPY IN GONITIS.—Gluschkow (*Russky Wratsch*, No. 19, 1912; ref. *Muench. med. Wochenschr.*, No. 12, 1913). Autoserotherapy has won a place for itself in the treatment of obstinately recurring serous pleurisy. The writer reports two cases of hydrops of the knee-joint successfully treated by this method. In one case, the effusion had been treated, by all the usual methods, for one hundred and thirty-two days, in vain. The fluid persisted almost unchanged. 2 c.cm. of the sero-fibrinous fluid was then aspirated and reinjected subcutaneously. The effusion promptly began to diminish and within twelve days had been completely absorbed. In the second case, no other treatment was attempted. 8 c.cm. of the fluid were withdrawn and reinjected hypodermically; fifteen days later, the exudate had entirely disappeared.

OCCULT BLOOD IN THE STOOL.—Boas (*Berl. klin. Wochenschr.*, 1913, No. 4). Boas has modified the test for occult blood in the stool as follows: Several fecal lumps, each about the size of a bean, are rubbed up in a porcelain dish with a mixture of one part glacial acetic acid to three of alcohol. The mass is poured on a small filter; if the filtrate is a very

dark brown color, it may be diluted with a few c.cm. of alcohol. A little powdered guaiac is dissolved in alcohol, so as to make a pale yellow solution. Of this, 10-15 drops are added to the filtrate and, without shaking, 15-20 drops of hydrogen peroxide. A blue or violet color indicates the presence of blood.

A NEW STAIN FOR TUBERCLE BACILLI.—F. Mas y Magro (ref. *Munch. med. Wochenschr.*, 1913, No. 6, p. 319). The stain is as follows:

1. The sputum is spread on a slide and dried.
2. Fixation in the flame or by half an hour at 120° C.
3. Stain for three minutes in Gosio's stain, warming three or four times until a light steam arises. Gosio's stain consists of methylene-blue medic. Hoechst 3.0, borax 5.0, distilled water 100.0. The solution must be old or have been kept uncovered in a thermostat at 37° C., for several days, with frequent shaking.
4. Place the specimen for three to four seconds in 25 per cent. sulphuric acid and
5. For forty seconds in absolute alcohol.
6. Dip into a mixture of equal parts of Elsbach's solution and absolute alcohol.
7. Wash in hydrant water; dry.
8. Decolorize in a solution of 50 per cent. alcohol 100.0, sodium hydrate 0.5, potas. iodide 1.0.
9. Wash first with hydrant, then with distilled, water.
10. Dry and mount.

This method stains the tubercle bacilli a rosy red, their intrabacillary granules dark red, all other bacteria and cells blue. It is said to surpass all previous methods.

PRACTICAL MEMORANDA.

By WILLIAM T. COUGHLIN, M. D., of St. Louis.

Advise the early removal of any tumor of the breast. Never wait for signs of malignancy. Have all tumors so removed examined by a pathologist and in the event of their being malignant have the radical operation done as soon as possible.

Repairing a lacerated cervix will not cure a general ptosis of the abdominal viscera, but it *will* lessen the liability of that cervix to cancer.

Either trifacial neuralgia or a severe and intractable migraine can often be permanently cured by a good rhinologist. The cause is very often found in the superior or middle meatus of the nose. When the trouble is of intranasal origin the attacks of pain are likely to begin in the naso-orbital or nasofrontal region, and between attacks pressure here reveals tenderness. In all cases of migraine or trifacial neuralgia be sure to have the nose examined and put in order.

Emetine is at present receiving very favorable mention in some of our foreign journals as a cure for amebic dysentery and also for amebic abscess of the liver. The dosage is small and the time required very short.

It is a recognized fact that sodium chloride has an irritating effect on the kidneys and no internist at present treats renal insufficiency without at least partially withholding salt from the dietary of the patient. Such being the case the unrestricted administration of normal saline solution in certain surgical conditions and after almost all abdominal operations cannot be entirely without danger to the patient.

"Proctoclysis by the drop method" means usually that there is delivered into the rectum of the patient at least 45 drops per minute of a normal saline solution. This is 45 drams per hour,—5.625 oz. of solution. Say a pint is given every three hours. As generally made up each pint of solution contains at least a dram of sodium chloride. It is no unusual thing to see the proctoclysis continued for from one to four days. Surely this cannot fail to have a bad effect even on the most normal of

kidneys. What about its effect on sensitive or diseased kidneys recovering from the effect of an anesthetic or already overloaded by the excretion of toxic materials? It is the water which the patient needs. Why not give it pure or with a minimum of salt?

In view of the fact that the hay fever season is again upon us, the following treatment recommended by Hoffman might be worth trying:—

Eight days before the date of habitual recurrence he recommends a dessertspoonful of the following solution three times a day:—

Chloride of calcium.....	10 gm.
Lactate of calcium.....	10 gm.
Simple syrup.	40 c.cm.
Distilled water.	400 c.cm.

Once fever has set in the patient takes a dessertspoonful every two hours till 40 or 50 gm. of calcium have been taken.

He claims that the calcium salts raise the vascular tonus and diminish the excitability of the vasodilators.

When operating for acute appendicitis, it sometimes happens that the condition of the appendix is such as to warrant the belief that some other lesion is responsible for the patient's symptoms.

Exploration should be made before removing the appendix, but in order easily to find the appendix again, after the exploration is finished, pass a thread through the mesenterium and bring its two ends outside the abdomen and clamp them with a forceps. It takes a little longer than to catch it with a forceps, but the thread takes up less room in the wound than the forceps, and with it there is no danger of injuring the bowel during the exploration.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

In a very few weeks now—on August 6th, to speak by the card—the Seventeenth International Congress of Medicine will be opened, at an inaugural meeting to be held in the Albert Hall, at 11 a. m. H. M. the King is Patron of the Congress, and Prince Arthur of Connaught is expected to represent his Majesty at the opening ceremony. Sir Thomas Barlow, who has recently been again elected President of the Royal College of Physicians of London, is, as doubtless is well known, the President of the Congress. Alumni of the University College and Hospital, London, may be pardoned if they feel some natural exultation when they remember that, not only is Sir Thomas Barlow one of the famous band of students, teachers, and investigators that have labored in Gower Street, but that Sir Rickman J. Godlee, the President of the Royal College of Surgeons of England, is still an active member of the hospital staff.

Other officers of the Congress are Sir Dyce Duckworth and Mr. Makins, the treasurers; Sir Alfred Pearce Gould, Sir Henry Morris and Sir T. Lauder Brunton, who are chairmen of committees, and Dr. Herringham, who is General Secretary. The office of the Congress is at 13 Hinde St., London, W., and it is thither that letters asking for information should be addressed, and that subscriptions, and applications for membership should be sent. The membership subscription is five dollars, and the wives and daughters of members may be enrolled on payment of half that sum for each person. A Ladies' Committee, under the chairmanship of Lady Duckworth, has been for some time actively prosecuting plans and arrangements for the entertainment of lady members of the Congress. A vast amount of work has been proceeding for several years, somewhat silently perhaps, with a view to the perfecting of the general organization and particular detail of the whole affair; and some idea of the magnitude of the undertaking is given, when it is stated that the official estimate is that some five thousand medical men, and some two thousand ladies, will be present. Those who are thinking of coming over from America for the first time to participate will be well advised, I fancy, if they so arrange matters that they are in London some few days before the 6th of August. There will then be ample time to settle down quietly and comfortably; and to establish pleasant relations with the new environment before embarking on the serious work of the meeting. Otherwise time will be lost and disappointment will be experienced by those who attempt too much in too short a period, and without due preparation, whether their objective be sight-seeing, attendance at 'functions' of a social character, or participation in paper-reading or paper-discussing.

Most of the sectional meetings will be held in that part of London known as South Kensington, the central office being at the Albert Hall. In this respect the Congress will have the advantage of dignified associations, and a worthy scenario; but, on the other hand, its chief venue will be distant some miles from many of our largest and most important hospitals.

London differs from Paris in not possessing any scholastic district such as the Quartier Latin. So that our hospitals, our 'colleges' and other institutions are widely separated, in a geographical sense. So far as the scientific work of the Congress is concerned, the final programme will not appear before June, but it is hoped that the list of independent papers accepted, and of intending speakers may then be published. Shortly before the Congress opens the 'reports,' which are to form the basis of the discussions, will be printed, and bound as a separate volume for each of the sections, of which there are, I think, nearly twenty.

Apart from the presentation of these special 'reports,' which will deal with the lists of subjects mentioned in the *Lancet* of October 19th, 1912, page 1116, there are to be general addresses; by Professor Chauffard, in Medicine; by Harvey Cushing, in Surgery; by Ehrlich, in Pathology; by Mr. Bateson, the exponent of Mendelism, in Heredity; and by the Rt. Hon. John Burns, President of the Local Government Board, in Public Health. Doubtless all these general addresses will be listened to with the attention that their great merits will deserve, but it may confidently be asserted, by those who are aware of the vocal resources of Mr. Burns, that his oration at least will be well heard, however great his audience. Lastly, I may, perhaps, mention that a circular has been issued to-day, giving information concerning travelling facilities, and places for temporary residence, etc., and without doubt copies of this will be forwarded on request to those who propose joining the Congress.

Whatever be the general verdict of the Congress as a whole, it is quite safe to say that no visitors will be assured of a more cordial welcome than those from America. The kindness and hospitality that so many of our more prominent surgeons, and others have recently received from you has been very much appreciated; and it has been very forcibly brought home to us lately that Americans, in surgery, certainly lead the way. Still, we cherish the hope that, for all that, we may still be able to show you a thing or two. Amongst the things that we shall take a pleasure in showing, will be the Museum that is being arranged under the auspices of a Committee organized and activated by Prof. Keith. Prof. Keith has only this week given us, at the Odontological Section of the Royal Society of Medicine, a delightful lecture dealing with the teeth of Neanderthal man. He is now convinced, from a comparison of all the known Neanderthal teeth yet discovered, that the men of Gibraltar, of Neanderthal, of Krapina and of St. Brelade's represented a species that is now utterly extinct; that was never a link in the direct line of descent of modern man from the apes, but represented a 'side-line' that has now vanished utterly. Neanderthal man was 'taurodont' while Mousterian man was, as modern man is, 'cynodont.' Dentists who have a knowledge of comparative odontology will appreciate the significance of these terms at once. However, these and many other points will doubtless be made clear to visitors by specimens at the Museum; and we know that whatever else we have not got in England, in the recently discovered Piltdown skull, we have the oldest fragments of mortal man that any living person has yet examined.

OBITER DICTA FROM FOREIGN JOURNALS.

THE INSANITY OF NIETZSCHE.

M. G., writing in the May 10th issue of *Le Progrès Médical*, gives a number of new points in regard to Nietzsche's insanity. Whether or not we agree with all his views, it cannot be gainsaid that what he writes is of sufficient interest to be translated:—

It can be said, without incurring the criticism of those who may feel that a critic is only too prone to discover insanity in men of genius, that Nietzsche, despite his extraordinary mental gifts or rather because of them, was insane, at least during the last period of his literary career. In default of evidence of a medical nature, the hitherto unpublished correspondence between Nietzsche and Strindberg, that Karl Strecker has given to the reading world in the April 1st number of *La Revue*, must suffice to prove the contention of Nietzsche's insanity.

Especially the last letters, those to which the unfortunate philosopher affixed his name thus: "Nietzsche Caesar, the Crucified," do away with all doubt as to his insanity. These letters indicate the slow advance of a mental change that conveyed to the philosopher an assured belief in his passionate desire for work and his mission in the world, but to physicians his ardor and intensity carry a different meaning. Other letters, especially those to Burckardt and von Seydlitz, were illuminating to such a degree that it was quite apparent that when Nietzsche proclaimed his "ethics of the master minds," thereby invoking the coming of the Superman and renewing the old Pythagorean doctrine of the 'universal year,' he was already what any physician of intelligence would pronounce insane. He presented to an extraordinary degree the most typical symptoms of delirium of grandeur and delirium of persecution, and, even before the final crisis, when his reason was destroyed forever, a complete upheaval had taken place which resulted in a radical change in his point of view in that there was complete concentration on himself.

"Come to see me at Sorrento," he wrote to von Seydlitz in 1877, "you will find a perfectly sensible man who has not a very high opinion of himself." Some years later, he asks the same friend to make a pilgrimage with him to Rapallo "that sacred place where was born the book of books—'Thus Spake Zarathustra.'" In another letter to von Seydlitz he says: "Between you and me, let it be understood, it is quite possible that I am the greatest philosopher of our times and that I am the link that binds together two thousand years." On his way to Florence, in the autumn of 1885, he relates that he met an Italian astronomer who knew by heart his "Human, All-Too-Human." On another occasion he asked, "what terrible Siberia is Europe preparing for my exile?"

Here, undoubtedly, we have an abnormal exaggeration of personality. Now, although his most characteristic phrases belong, for the most part, to the last three years of his career, during which he wrote "The Genealogy of Morals," "The Case of Wagner," "The Twilight of the Idols," "The Antichrist," and a part of "Thus Spake Zarathustra," one would not be far

wrong in asserting that his insanity was in its incipency a number of years before his last days. Without agreeing with Max Nordau in his "Degeneration" or with Möbius that "The Birth of Tragedy" and "Thoughts Out of Season" are the works of an insane person, one cannot refrain from believing with Dr. Michaut (*Clinique chirurgicale*, 1913) that when Nietzsche wrote "The Dawn of Day," his paresis was already doing its destructive work. In Elizabeth Förster-Nietzsche's "Der Junge Nietzsche" (Alfred Kroener, Leipzig) one learns that throughout his whole life, whether he attached himself to a man or to a doctrine, Nietzsche's first thought was to protest against all those who had preceded him in the attachment. Philologue, he never ceased to affirm that he alone understood philology; admirer of Schopenhauer, he would not admit that anyone else had the right to admire him. And when he became a Wagnerite, he did not hesitate to declare that the Wagnerites are fools, "not one of them has enough sense to comprehend opera or drama."

Moreover, who can doubt his complete insanity when one reads, for example, the following in explanation of his preachment—the ethics of the master minds: "Behold the new law, O my brothers, that I decree for you: Become pitiless!" . . . "Who can be capable of great deeds if he feel not the strength and the desire to inflict great suffering?" And his ridicule of Christianity is also the act of a madman.

His insanity is much more evident because of the biographical documents published by his sister, which show Nietzsche, the Superman, the arch-enemy of compassion and kindness, the man who wrote: "Become pitiless," in the rôle of an honest, worthy man, a good son, a good brother, a good friend, an excellent patriot, charitable to the extent of depriving himself of everything, and compassionate to the point that the thought of the suffering of others was more painful to him than his own distress. These documents impress the reader painfully, since they show that despite his lucidity there were already preliminary signs of his forthcoming insanity; but, even in his worst attacks of megalomania, his kind-heartedness retained its moral beauty, even his delirium of persecution not being able to give rise to hatred or anger. "Never has there been," says Théodor de Wyzewa (*Revue des Deux Mondes*, July, 1899 and October 1st, 1900), "a deeper chasm between the heart and mind of a man; but, though the heart was healthy, the mind was unbalanced, a prey already to the disease which entirely destroyed it."

Nietzsche ended by being a dement. The question to be asked is, Should the works of this philosopher be judged only as one would any other pathological document? Evidently not. The insanity of Nietzsche is an argument neither against his genius as a literary man nor as a philosopher. There are in his works, even in his most aberrant ones, many profound and charming thoughts. In his case, undoubtedly genius coexisted with insanity. Has this not taken place in others? But this is not proof that genius is the result of insanity, or that even in those cases where men of genius were insane was their genius dependent on their insanity. But it proves, perhaps, as Théodor de Wyzewa advances, that in the works of a genius the reader should differentiate between what is the outcome of genius and what may in all fairness be attributed to a mental disturbance. Who knows but that the wisest course to pursue in reading Nietzsche is not to follow the advice of old Burckardt, who was content to enjoy the poetic grace of his writings, and did not attempt to comprehend everything, since he was of the opinion that only too often an author's thoughts are so far in advance of our own that they are "too far above our heads" to be understood.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The May meeting of the St. Louis Medical Science Club was held at the Barnard (Free) Skin and Cancer Hospital, May 13th, at 8:15 p. m. Dr. Garrey presided. The following was the program of the evening:—

1. Morphological Changes in the Erythrocytes of the Mammalian Embryo.....Victor Emmel
2. Intravenous Injections of Various Substances in Animal Cancer.Leo Loeb and Moyer S. Fleisher
3. Further Observations on the Virus of Rabies.....D. L. Harris
4. Transplantation of Tumors in Animals with Spontaneously Developed Tumors.....Moyer S. Fleisher and Leo Loeb
5. Transplantation of Thyroid Tissue and the Effect of Potassium Iodide on Thyroid Grafts.....Carroll Smith

(Signed) MOYER S. FLEISHER, *Secretary*.

MORPHOLOGICAL CHANGES IN THE ERYTHROCYTES OF THE MAMMALIAN EMBRYO.

By VICTOR EMMEL, M. D.

It was found that the erythroblast of the pig embryo, in place of being spherical as generally described, may, in the later stages of cytomorphosis, assume a biconcave or cup shape; its nucleus becomes smaller, more compact, eccentric in position, and not infrequently also flattened in form; mechanically rotated, the erythroblasts tend to orient themselves with the nuclear region remaining on the under side, as if loaded; and their reaction to changes in osmotic conditions indicates a structural difference between the nuclear and cytoplasmic poles. These observations were discussed with reference to the question of the correlation of the form of the definitive plastid with the enucleation of the erythroblast, the formation of a lecithin containing membrane, hemoglobin differentiation, and the factors involved in determining the eccentric position of the nucleus.

In some eighty culture experiments, non-nucleated plastids were observed to arise from the parent erythroblast by a process of cytoplasmic constriction. In size, form, hemoglobin content and stain, these culture plastids are comparable to the normal circulatory plastids. Observations on living and fixed material indicate the occurrence of a similar process within the embryo. These results accordingly raise the question whether the origin of non-nucleated red blood corpuscles by a process of cytoplasmic constriction, rather than by nuclear extrusion or intracellular nuclear disintegration, does not merit more serious consideration.

INTRAVENOUS INJECTIONS OF VARIOUS SUBSTANCES IN ANIMAL CANCER.*

By LEO LOEB, M. D., AND MOYER S. FLEISHER, M. D.

In continuation of our former work, we carried out a study of the action of two classes of substances on carcinoma in mice. First, we investigated the action of some inorganic substances; and, secondly, of various albuminous substances and also of a carbohydrate and a lipid. We wish to give here briefly the result of our investigations.

Colloidal copper and colloidal platinum acted in a similar manner; both inhibited the growth of tumors during the time of injection. Colloidal sulphur, if active at all, is certainly not more active than either colloidal copper or platinum. On the other hand, easily ionized salts of copper and of lanthanum are without effect on cancer. Combinations of copper with proteid substances are active.

We also tested one organic substance which, according to Morgenroth, is very active in preventing pneumococcus infection—namely, ethylhydrocuprein. We found it without effect on cancer. Of the more complex organic substances we tested the following: Various preparations of casein and of nucleoprotein; furthermore, serum globulin, horse-serum, egg-albumin, Witte's peptone, protamin, gelatine, lecithin and starch. Of these various substances only the first two named, casein and nucleoprotein, were effective, while all other substances were entirely inactive. One single intravenous injection of either of these two substances destroyed, in a large number of cases, a great part of a tumor; while repeated intravenous injections prevented the growth of the tumor during the period of injection. After cessation of the injections, the growth started again in the majority of cases, either immediately or after a period of latency.

The fact that another entirely different substance—namely, leech extract, also exerted a marked action on tumor growth similar to nucleoprotein and casein, but acting apparently somewhat more strongly than these latter two substances, seemed to us of great interest. We observed, in a number of cases, after intravenous injection of leech extract, even a retrogression of the tumors, while one single injection caused a liquefaction and necrosis of a great part of the tumor. Also combinations of nucleoprotein and leech extract were effective.

It seems, therefore, that of the various proteins, carbohydrates and lipoids which we have tested so far, only the complex phosphorus-containing proteins are active. Among other substances we found leech extract active, and among inorganic substances only colloidal metals.

Very young tumors, from two to six days old, do not seem to be as easily influenced as are those from nine to fourteen days old. Only intravenous injection was effective.

We also investigated the action of some of these substances on experimentally produced placentomas in the guinea-pig and rabbit. We found usually, after one injection of casein, some hemorrhages and subsequent necrosis; colloidal copper seemed so far to be without any marked effect on placentomas. With Dr. W. E. Leighton we examined the effect of casein and of colloidal copper on wound-healing in white mice. The intravenous injection of these substances had no marked effect on the process of wound-healing.

*From the Department of Pathology of the Barnard (Free) Skin and Cancer Hospital, St. Louis.

In order to study further the action of the substances, we injected a series of normal guinea-pigs intravenously with the various solutions which we had tested in the case of tumors, and we found that one single injection of nucleoprotein, casein, protamin and perhaps egg-albumin, caused frequently multiple necroses of the liver. The necrotic areas were usually situated midway between the portal and central part of the acinus. Other substances, like gelatine and starch, have not so far caused necrosis of the liver in our experiments. We notice that there is no absolute correspondence between the action of the various substances on tumors and on the liver. In the guinea-pig some substances which are without effect on tumors cause necrosis of the liver. Moreover, we have not been able to observe these necroses in the liver of the mouse, even after repeated injections of those substances.

We have been well aware of the fact that many guinea-pigs, which have not previously been injected with these substances, may show scattered areas of necrosis in various parts of the liver. The necrosis which we find after the injection of the substances used in our experiments is apparently not of the same type as the necroses found in control guinea-pigs. We are investigating still further the question of how much of the necroses found is to be attributed to the injection of those substances and how much is due to other causes. At present, therefore, we do not wish to make our statement a definite one, in regard to the causation of the necroses in the guinea-pig.

We think it most probable that the various substances, which we found active in cancer of the mouse, change the capillaries primarily, increasing their permeability to the various constituents of the blood.

We reported previously that the intravenous injections of colloidal copper exerted a definite action on a number of human cancers, provided they had not been growing too rapidly. These injections of colloidal copper, as we also stated before, can, even in the most favorable cases, at present only lead to a partial retrogression of carcinoma in man. It is noteworthy that while some cases are affected favorably, other apparently similar cases are not at all, or very slightly, influenced by these injections. In further experiments carried out in conjunction with Drs. H. N. Lyon, C. B. McClurg and W. O. Sweek, we also found that intravenous injections of solutions of casein may exert a certain inhibiting action on the growth of some carcinomas in man; it is, however, less effective than colloidal copper. In one case of sarcoma of the humerus, which we treated, injections of colloidal copper followed by injections of casein produced a decided retrogression and calcification of the tumor.

Although we have not as yet noticed that the casein has any injurious effect in patients, our observations regarding the possible production of necrosis of the liver in the guinea-pig after intravenous injection of various proteins—observations which we first made in the latter part of March—seem to us to make the use of such proteins in the case of human beings inadvisable at present.

We expect to publish a more complete report of our observations concerning the effect of colloidal copper and of casein in human cancers, in the near future. Then we shall discuss in detail the limitations and the various difficulties in this mode of treatment.

FURTHER OBSERVATIONS ON THE VIRUS OF RABIES.

By D. L. HARRIS, M. D.

Further experiments on desiccated virus show the infectivity to be preserved for at least five hundred days; and its use in antirabic immunization, both in animals and human beings, shows it to be more readily administered and as efficient as any other method now known. One hundred and eighty-two patients have been treated by this method with no complications and no bad results. The preparation of this material is economical to the laboratory in time, labor and money, and it is administered to the patients in a much shorter time than is the present practice of the Pasteur method.

TRANSPLANTATION OF TUMORS IN ANIMALS WITH
SPONTANEOUSLY DEVELOPED TUMORS.*

By MOYER S. FLEISHER, M. D., AND LEO LOEB, M. D.

The large majority of all experiments in transplantation of tumors was carried out on normal animals. It was apparently tacitly assumed that the condition existing in normal animals or in animals with an inoculated tumor, on the one hand, and in animals with a spontaneous tumor, on the other hand, were identical. The first experiments, in which tumors were transplanted into animals with spontaneous tumors, were reported about eleven years ago.¹ Loeb found at that time that pieces of an adenoma of the mammary gland of a white rat could be transplanted very much more easily into a rat in which a tumor originated than in other rats. Later Loeb and Leopold² found a similar condition to prevail in the case of a mixed tumor of the breast of a dog, in which pieces of tumor could be easily inoculated in the animal in which the tumor originated, while the tumor could not be transplanted into other animals. It was especially noteworthy, in both these series of transplantations, that transplanted pieces remained alive *in toto* in the animal in which the tumor had originated spontaneously, while in other animals the whole transplanted piece or at least its centre became necrotic; and, as is well known, after transplantation of the ordinary tumors transplantable into other individuals, the centre remains necrotic while the periphery remains alive in cases of successful transplantation. Loeb³ also reported later a few observations in mice which seemed to point to the conclusion that mice in which a tumor had originated spontaneously were more liable to form a good soil for the growth of spontaneous tumors of other mice than normal mice without spontaneous tumors. We had, however, made only very few observations concerning this point and our conclusion in this respect was only a tentative one.

The results of our experiments, carried out within the last two and a half years, are sufficiently definite to permit the conclusion that in mice with spontaneous tumors there is a factor present which permits tumors in general to grow better than in mice in which no spontaneous tumors had developed.

There is therefore intimately connected with the development of a spontaneous tumor in an animal, a condition which favors tumor growth in general. There is, however, another conclusion to be drawn from these

*From the Department of Pathology of the Barnard (Free) Skin and Cancer Hospital, St. Louis.

results. Inasmuch as the percentage of cases in which tumors grew in the same individuals in which they originated is considerably greater than the percentage of growth in other individuals with spontaneous tumors, we must assume that the great facility with which tumors grow in the individual in which they develop spontaneously is due to two factors: First, the factor which we mentioned—namely, the presence of a condition favoring tumor growth in general in animals affected with a spontaneous tumor; and, secondly, a condition not specific for tumors but applying to other tissue as well—namely, a condition which favors the growth of certain animal tissues in the animal in which the tissue originated as compared with the growth of the same tissues in other animals of the same species. This latter fact is evidently due to a chemical adaptation existing between the physico-chemical character of the body fluids and the composition of the tissue.

If we investigate the growth of transplantable tumors which are apparently less sensitive to the lack of this specific adaptation between tissue and body fluids than the large majority of ordinary tumors, then we find that it grows in mice with spontaneous tumors not quite as well as in normal mice, especially if we investigate such an ordinary transplantable tumor under conditions in which its virulence has been experimentally decreased. Such material, however, grows better in mice with spontaneous tumors than in mice in which one of the ordinary rapidly proliferating transplantable tumors is growing. In all probability the spontaneous tumors call forth some immune reactions which are not present in normal mice; but they call forth immune reactions of less intensity than the rapidly growing ordinary transplantable tumors. We have furthermore established the fact that those mechanisms, which lead to an inhibition of growth in normal mice through an inoculation with a surplus of tumor or through a previous or simultaneous injection with spleen tissue, are also operative in mice with spontaneous tumors, and approximately to the same extent as in normal mice.

BIBLIOGRAPHY.

¹ Loeb (*Journ. Medical Research*, Vol. VIII, No. I, 1902).

² Loeb and Leopold (*Journ. Medical Research*, Vol. XVII, 1907).

³ Loeb (*Medical Bulletin University of Pennsylvania*, March-April, 1907).

TRANSPLANTATION OF THYROID TISSUE AND THE EFFECT OF POTASSIUM IODIDE ON THYROID GRAFTS.

By CARROLL SMITH, M. D.

The object of this work was to correlate the findings of Marine and Lenhart and the experiments of von Eiselsberg, Cristiani, Enderlen and Sultan.

Marine and Lenhart found that normal glands, in which the necessary minimal iodine content was lessened, became hyperplastic glands. If the iodine content of a hyperplastic gland was increased, the thyroid became a colloid gland, which they claim is the nearest to normal to which a hyperplastic thyroid can return.

Marine claims that the amount of iodine in a gland varies inversely with the degree of thyroid hyperplasia. He asserts that the greater the amount of iodine present, the less need there is of thyroid tissue, but that iodine has no effect on the growth of normal glands.

The second group of workers found that only the peripheral part of thyroid grafts persisted, the central part becoming necrotic. New thyroid tissue, by proliferation of the persistent thyroid at the peripheral zone of the graft, gradually replaced the central necrotic tissue. This regeneration was complete at the end of three months, and the graft differed from a normal gland by an infiltration of connective-tissue.

Cristiani claimed that thyroid grafts undergo atrophy when 0.2-0.6 gm. of thyroid tablets are given daily to the animal, and concluded that the development of thyroid grafts seems proportionate to the thyroid need. Marine claimed that the greater the amount of iodine present, the less the need for thyroid tissue.

I have attempted to find out if the administration of potassium iodide to animals, with proliferating thyroid grafts, would have any effect on the grafts by decreasing the need of thyroid tissue. Guinea-pigs were used in most of the experiments, but rats were employed in some cases. The left lobe of the thyroid gland was exposed and a bit of the tissue was transplanted subcutaneously into the ear. The remainder of the lobe was grafted subcutaneously into the abdomen. A second animal was operated on in the same way and was kept as a control. 0.2 gm. of potassium iodide was given to the first animal four days after the operation, and the dose was repeated daily until the animals were killed. I examined grafts from eleven days to three months old.

I found that the regeneration of the grafts proceeded from the peripherally preserved thyroid tissue into a central necrotic portion, as reported by the previous observers. Specimens taken at four, six, eight and twelve weeks showed well-regenerated grafts with more or less connective-tissue infiltration in all of them. There seemed to be more connective-tissue in the grafts from the animals to which potassium iodide had been given; otherwise the grafts were very similar, histologically. In none of the animals to which potassium iodide had been fed did I find any atrophy of the grafts.

It seems justifiable to conclude (1) that potassium iodide has no effect on thyroid grafts except to increase connective-tissue infiltration; (2) that potassium iodide does not cause atrophy of thyroid grafts.

BOOK REVIEWS.

THE PITUITARY BODY AND ITS DISORDERS. Clinical States Produced by Disorders of the Hypophysis Cerebri. By Harvey Cushing, M. D., Associate Professor of Surgery Johns Hopkins University, Professor of Surgery (Elect) Harvard University. An Amplification of the Harvey Lecture for December, 1910. 319 Illustrations. Philadelphia and London: J. B. Lippincott Co. 1912. Price, \$4.00.

There are few books which the reviewer approaches with a keener sense of pleasurable anticipation than this book of Cushing's on the pituitary body and its disorders. Those who are acquainted with the Harvey Lectures of 1910, which had for their subject the results of hypophyseal disease, awaited the appearance of the more complete studies with interest.

In the present state of the development of our knowledge of internal gland secretion, the hypophysis presents a subject of peculiar importance. The most recent development in the growing field of neurological surgery has been the inclusion of the hypophysis in the domain of active surgical manipulation, either by the partial or complete removal of the enlarged gland itself for the relief of symptoms depending upon the alteration of its physiological functions, or for the group of symptoms developing as a result of the mechanical forces put into activity by this enlargement.

With the accomplishment of a measure of relief in some cases has come, naturally, the desire to understand just what happens when the gland is diseased, either in over- or under-functionating states. There are two ways by which such knowledge can be obtained: One, by the study of cases and analysis of symptoms existing before and after operative interference; secondly, by the study of the experimental data obtained after removal of the normal gland in animals, partial or complete, and a substitution for the action of the gland of artificially produced extracts of the gland itself injected into animals deprived of its function. All these questions and many more find a place in Cushing's book, and all of them reflect not only opinions as derived from a most thorough consideration of the literature, but from the personal experience of the author himself, viewed from the laboratory and the hospital wards.

It can be seen from this sketch of the purpose and tendencies of this book, how broad Cushing's point of view is. In the present fragmentary state of our knowledge on this subject, it is remarkable to note the eagerness with which all the data thus far known have been garnered. The searching criticism and analysis directed to this body of data, as well as such facts as the author himself has obtained, is a rare achievement. It is certainly a matter of great interest to realize that we have reached a stage where there is a physiology of the hypophysis, or, at least, a tentative approach to the proper study of its function.

The pathology, the anatomy and the physiology of the hypophysis form the introductory chapters, and in each of them can be seen evidence of the author's own work, corroborating frequently the results which have been obtained by other investigators.

Although the number of facts now at our disposal is not very large, yet we can distinctly see the promise which is before us; and in its initial stage as set forth in Cushing's book we can imagine how large the field will finally become, and with what success its cultivation will be attended.

In the second part of the book there is given a clinical exposition of the symptomatic phenomena of the pituitary body changes, which deserves the greatest praise; it is a masterful exposition of the subject.

Of particular interest is Cushing's classification, based upon analysis of the fifty odd cases which form the clinical basis of the book. However incomplete this may be, Cushing is in no way dogmatic; he gives us a skeletal outline upon which to correlate such facts in a clinical sense as are now at our disposal.

A study of the individual cases as given in the series included in the book is a splendid exercise in arriving at deeper clinical knowledge of the various

manifestations of the disease. It is excellent clinical reporting, and by that is meant not only the marshaling of facts, but there is a continuous story to tell, so to speak, which in some way or other makes the description bear a kind of human touch. In reading some of these cases, one feels that he is almost face to face with the individual who is the unfortunate subject of the disease.

The analysis of symptoms, the collection of data, photographs, the ocular examinations and pathological specimens are arranged in a way that is very suggestive and emphasizes again the actual disease process. As one reads along from case to case, one becomes aware that the subject of hypophyseal disease unrolls before him in all its manifestations, from the simple clinical picture of acromegaly to that of complicated cerebral tumor manifestations, with queer and unusual trophic and glandular abnormalities. Too much praise cannot be given to this phase of the clinical description, and if one might say that it approaches very near the ideal which the French authors particularly have given in their numerous clinical contributions on this subject, the best possible measure of Cushing's excellence in this regard can be obtained.

Part III deals with a general review of incidence, symptomatology and treatment, and in this part is contained a discussion of the various hyperplastic aspects of this disease.

One naturally turns to the chapter on treatment with more than usual interest, for here we have the purely surgical point of view, because whatever the future may show, at present this is the only method of treatment which offers any hope for relief. The purpose of surgical interference is, first, to meet general pressure disturbances; secondly, to combat functional hyperplasia, and, thirdly, to afford relief to neighboring symptoms.

A few pages are devoted to other than surgical measures, and, naturally, included in this chapter is a careful discussion of the purely technical procedures which are essential for surgical success.

The reviewer feels that he can in no other way characterize this book of Cushing's than by saying that it is easily the very best book that has as yet appeared—the best not only because it contains practically all the facts that we know about the pituitary body, but likewise that these facts are put together in a most interesting and illuminating way. This book is no dry account of sterile facts, but it is redolent with the personality of a virile and imaginative investigator, whose scientific attitude is shown on every page, and whose fairness and clearness of judgment are seldom at fault. Every neurologist should read this book, every surgeon whose interest at all approaches the nervous system should have it in his library, and anyone to whom the progress of medicine is of vital interest would do well to know this book for the sake of realizing how facts in the darker territories of medicine should be obtained.

FATIGUE AND EFFICIENCY. A Study in Industry. By Josephine Goldmark, Publication Secretary National Consumers' League. Introduction by Frederic S. Lee, Ph. D. Containing also the Substance of four Briefs in Defense of Women's Labor Laws by Louis D. Brandeis and Josephine Goldmark. New York: Charities Publication Committee. 1912. Price, \$3.50.

This book of Miss Josephine Goldmark's is, perhaps, the most important of the Russell Sage Foundation publications. Its significance lies in two aspects of the question of industrial efficiency: First, it brings to the elucidation of that problem the facts and experimental data of the physiological laboratory on the phenomena of fatigue; and, secondly, it attempts to correlate these conclusions with some of the industrial questions of the present time.

Of great value likewise is Part II, which contains a résumé of the world's experiences, upon which the legislation limiting the hours of labor for women is based. This consists of the material contained in four briefs submitted by Mr. Louis D. Brandeis to the Supreme Courts of various states, in defense of the constitutionality of these measures.

The unusual point of view of the authoress' method of approach may be gathered from the opening lines of the chapter on the nature of fatigue. She here says, that the world's industrial experience shows the need of more complete protection for the worker. This, however, merely creates the presumption that labor legislation is needed. The scientific proof, however, is to be found in the study of the common physiological phenomena of fatigue as the normal result of human effort. This is susceptible of actual objective proof in the laboratory, and it can be taken as the scientific basis upon which rests the necessity for labor legislation for the shorter working day in industries.

"It is precisely in explaining the normal and abnormal aspects of fatigue, its

natural effect and relation to all human life that Science can give its authoritative sanction to labor legislation." This represents fairly the spirit of the book, a spirit with which every fair-minded reader must be in complete sympathy.

In Chapter III various industries are analyzed from this physiological point of view and the various factors which lead to the production of fatigue beyond the normal are set down. This is done with great clearness and is so obviously fair and reasonable that they appear indisputable.

The effects upon the workers are next taken up, and the authoress here allows herself some speculative scope, particularly on the eugenic features of the subject. This seems, however, justifiable, and the conclusions are amply supported by the facts and deductions of the investigators whose work is quoted.

The physician is, perhaps, less interested in the economic aspects of regulation and in the question of the newer efficiency so vigorously fathered by Mr. Brandeis than in the more medical side of the question, which has previously been outlined. But it is interesting reading, nevertheless, and certainly tends to a broader view of industrialism. It is difficult to repress the tendency to praise this book overmuch. Its pure scholarship and patient research into the original sources of information are everywhere apparent. Its absence of dogmatism and the pleading of a cause by emotional appeals are particularly to be commended. The style is easy, clear and readable. Apart from every technical consideration, this is an interesting book, full of information. No one can read it without gaining a broad understanding of our present industrial problems. No physician can afford at this time to be in ignorance of these large social and economic questions, and nowhere can he find a better statement of them than in Miss Josephine Goldmark's "Fatigue and Efficiency."

THE INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment and Practitioners' Index. Thirty-first Year, 1913. New York: E. B. Treat and Company. 1913. Price, \$3.50.

If there is an annual published that has greater value than the volume under consideration, the reviewer is not aware of the fact, and until further enlightened will continue to regard "The International Medical Annual" as a contribution to medical literature that has the hall-mark of discrimination, judgment, and thoroughness. The contributors—and they are among the best which England can offer us to-day—need no introduction to the medical reader in this country, since anyone who is a reader of the leading English journals has long since recognized their claim to a ripe scholarship. This "Annual" is truly encyclopedic in its scope, a fact which should prejudice the reader for it; and since nothing in this country approaches it as regards brevity, absence of superfluous writing, and a directness that only the hand experienced in these matters knows how to value at its true worth, we are not going too far in our enthusiasm when we say that no bookshelf can be considered complete without it. Every physician who can appreciate the giving of knowledge in an attractive form, in a manner at which no one could cavil; who can differentiate between clearly expressed thought and the opposite; who is censorious in his criticisms of a slovenly style of writing and the sort of patchwork that is deemed 'good enough' for a medical article, should at once possess this "Annual," if only to see in how far our English confrères are superior to us in the matter of scholarship.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on Treatment, Medicine, Surgery, Neurology, Pediatrics, Obstetrics, Gynecology, Orthopedics, Pathology, Dermatology, Ophthalmology, Otology, Rhinology, Laryngology, Hygiene, and Other Topics of Interest to Students and Practitioners. By Leading Members of the Medical Profession Throughout the World. Edited by Henry W. Cattell, A. M., M. D., Philadelphia, U. S. A. Volumes I, II, III, IV. Twenty-second Series, 1912. Philadelphia: J. B. Lippincott Company. 1912. Price, \$2.00.

Taking up these excellent quarterlies in sequence, one is struck at once with the painstaking care with which each article has been edited by Dr. Cattell and his collaborators. In Vol. I, for instance, The Management of the Post-Operative Period of Mastoiditis by Dr. Samuel J. Kopetzky, of New York, is important enough to be read by the majority of otologists, who, no matter how clever they are as operators, are at times quite negligent in the matter of after-treatment. Experimental Poliomyelitis by Dr. Simon Flexner is another outstanding paper that should be read with the closest attention, since this disease is still about the most baffling one in medicine. But if these two are mentioned and others are

passed over, it is not because they lack in interest, but because it is the intention of the reviewer to convey to the reader only an idea of the profitable reading which will be his if he invest in this book. Vol. II makes the same bid for the closest attention, for it, too, has papers which no physician, who wishes to keep abreast of the times, can afford to neglect. Whether he turn to *The Management of Sunstroke* by Dr. Simon Baruch, of New York, *Headaches and Tender Points in Diagnosis* by Dr. G. K. Dickinson, of Jersey City, *The Rôle of the Streptococcus* by Dr. W. H. Waters, of Boston, *Pellagra* by Dr. George C. Mizell, of Atlanta, *Intraspinal Anesthesia* by Dr. William A. Steel, of Philadelphia, or to the other papers, he will learn about all there is that is new on subjects which have been selected by the various collaborators with discrimination. Vols. III and IV are no exception to the high standing of the previous volumes, and again attest what careful editing really amounts to. In Vol. IV we would call the reader's attention to *The Prognostic Value of an Immediate Examination of Peritonitic Exudates* by D. P. D. Wilkie, M. Ch., F. R. C. S., of Edinburgh, on account of the attempt, on the part of this surgeon, to bridge over the chasm that only too often exists between the surgeon's ideas and those of the bacteriologist. In short, these four volumes covering medicine for 1912 are of so high a value that it is not overpraising them to say that any physician, who has the interests of modern medicine at heart, would be strangely laggard were he to overlook their significance as educative factors in his progress toward a better understanding of disease.

LEAD POISONING AND LEAD ABSORPTION. *The Symptoms, Pathology and Prevention, with Special Reference to Their Industrial Origin and an Account of the Principal Processes Involving Risk.* By Thomas M. Legge, M. D. Oxon., D. P. H. Cantab., H. M. Medical Inspector of Factories; Lecturer on Factory Hygiene, University of Manchester, and Kenneth W. Goadby, M. R. C. S., D. P. H. Cantab., Pathologist and Lecturer on Bacteriology, National Dental Hospital, etc. New York: Longmans, Green and Co. 1912. Price, \$3.50.

This is a very good monograph on the subject of lead poisoning, its symptoms, pathology and prevention. The authors take the point of view, basing their evidences on experimental and statistical data, that the causation of lead poisoning is through the inhalation of dust; and if their conclusions are convincing, therefore the means of industrial prevention are readily at hand. This lies in methods aimed to carry away the dust which is formed in the various processes. By these simple means the dust can be removed and the workers' health can be preserved.

The book is divided into chapters on susceptibility and immunity, pathology, diagnosis and symptomatology, the excretion of lead, the nervous system, treatment and prevention. At the end of each chapter is given a very complete bibliography which, for the most part, carries the subject up to date.

At the present time industrial diseases are among the most vital subjects in preventive medicine, and every physician should be somewhat informed on the diseases which may follow in the pursuit of certain industries. Among them all, lead is probably the most important of the chemically-produced diseases.

The book is interestingly written, well arranged, and contains a number of illustrations which make clear the methods of prevention and the mechanical problems which are a part of the industry. This book can be recommended as a complete exposition of our present knowledge on the subject of lead poisoning.

MEDICAL MEN AND THE LAW. *A Modern Treatise on the Legal Rights, Duties and Liabilities of Physicians and Surgeons.* By Hugh Emmett Culbertson, of the Ohio and New York Bars; Contributing Editor to the *Laning, Ohio, "Encyclopaedic Digest,"* etc. etc. Philadelphia and New York: Lea and Febiger. 1913. Price, \$3.00.

This is probably the best short treatise on law and medicine that has appeared within the last few years. It is written by a lawyer who has had wide experience and possesses extensive knowledge of the law as it refers to problems which come into the life of every physician.

The author has made an effort to avoid technicalities as far as possible, and to make the law clear upon the important questions which it is the business of the medical man to know at first hand, if possible.

The chapter on the law of malpractice is especially commended.

There are a number of illuminating cases quoted, illustrative of the points which are touched upon in the text.

In this comparatively brief treatise is contained all that is necessary for a

physician to know in regard to legal questions which arise in the course of his daily work. There is, perhaps, no better protection against unfair legal proceedings than a thorough knowledge of the law and its interpretation, and there is no place known to the reviewer where this information can be obtained in a more pleasing and interesting way than in this book of Culbertson's.

An evening spent reading the pages of this book should be of great advantage; and at this time when litigation is so frequent and easy, and when so often the physician suffers from ignorance, the protection gained by a knowledge of the sort contained in this book ought to be helpful.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. By Leading Members of the Medical Profession Throughout the World. Edited by Henry W. Cattell, A. M., M. D., Philadelphia, U. S. A. Volume I, Twenty-third Series, 1913. Philadelphia and London: J. B. Lippincott Company. 1913. Price, \$2.00.

In the first volume of the series issued for 1913 the reader will soon become aware that the excellence of these quarterlies is upheld. No surgeon should merely skim through the paper by Dr. J. Torrance Rugh, of Philadelphia, on a Report of Ten Cases Operated Upon for Pott's Disease of the Spine by Albee's Method of Bone-Grafting, for as regards information and illustrations it easily ranks with the best papers published in 1913, and moreover puts a quietus on any objection which might have been raised to the excellence of Albee's method of bone-grafting. The 10 cases are described in detail and are striking in that they give the reader a complete history of each case, a fact which should be emphasized here, since this is often neglected even by well-meaning medical writers. The Psychological Clinic as an Inter-clinic by Dr. Arthur Holmes should interest the pediatricist, for the reason that much that is new is contained in the paper, and will illuminate, especially along those lines which have to do with the medical inspection of school children. The pages devoted to Progress of Medicine During the Year 1912, by the editor, Dr. Henry W. Cattell, of Philadelphia, and Dr. Lucius W. Johnson, of the United States Navy, number 115 against 44 in Vol. I of the twenty-second series; and, not only on account of the numerical increase, but also on account of the excellent material which they contain are a résumé of medicine which cannot be found elsewhere. The medical man, who is constantly complaining that he has no time to read, should not fail to own this volume, since just what he wants, so that no inroads into his time will occur, will be found in a careful abridgement without any sacrifice of what should be preserved. Vol. I is an exceedingly good contribution to the literature of the day that has all the earmarks of an editorship that invites only the highest praise.

HANDBUCH DER PRAKTISCHEN CHIRURGIE. Bearbeitet und Herausgegeben von Geh.-Rat Prof. Dr. P. von Bruns, in Tuebingen, Geh.-Rat Prof. Dr. C. Garre, in Bonn, und Geh.-Rat Prof. Dr. H. Kuettner, in Breslau. Vierte umgearbeitete Auflage. Fuenf Bände. I. Band. Chirurgie des Kopfes. Stuttgart: Verlag von Ferdinand Enke. 1912. Price, 29 m.

The first edition of this system of surgery appeared in 1900, and almost immediately attained a position among the classical larger works on surgery. Two of the original editors, von Mikulicz and von Bergmann are now dead, and their places have been taken by Garre and Kuettner. The fact that within a period of ten years, four editions have been called for, and the further fact that the work has been translated into practically all the modern languages, testifies to the distinct place that this handbook has made for itself in modern surgical literature.

This first volume follows very closely the same volume of the earlier editions. It contains some sixty odd pages less reading matter than does the first volume of the 1900 edition—a condensation that merits approval. The chapters on surgery of the scalp, skull, meninges, and brain, originally planned and written in masterly style by von Bergmann, have been only slightly modified and added to by Kuettner. The surgery of the ear by Kuemmel, of the face by Lexer, of the head neuralgias by Krause, and of the salivary glands by Kuettner stand about as they have in previous editions. Injury and disease of the jaw, originally contributed by Partsch, has been rewritten by Rømer and Perthes who have added to this chapter an interesting section on the teeth and gums. The three closing chapters on the nose and its accessory sinuses, and the mouth and the pharynx are modified only in minor particulars.

Each chapter ends with an excellent though brief bibliography which furnishes adequate material for collateral reading.

THE BUSINESS OF BEING A WOMAN. By Ida M. Tarbell, Associate Editor of the "American Magazine," author of "Life of Abraham Lincoln," etc. etc. New York: The Macmillan Company. 1912. Price, \$1.25.

The contents of this latest noteworthy contribution to the woman problem can be briefly indicated by simply quoting a few sentences from the first and last pages of the volume.

Chapter-I begins as follows: "The most conspicuous occupation of the American woman of to-day, dressing herself aside, is self-discussion. It is a disquieting phenomenon. Chronic self-discussion argues chronic ferment of mind, and ferment of mind is a serious handicap to both happiness and efficiency. . . . To an unaccustomed observer she seems always to be running about on the face of things with no other purpose than to put in her time."

And from the last page we may cite the following sentences: "A few women in every country have always and probably always will find work and usefulness and happiness in exceptional tasks. . . . There is no reason why these women should be idle, miserable, selfish, or antisocial. There are rich lives for them to work out and endless needs for them to meet. But they are not the women upon whom society depends; they are not the ones who build the nation. The women who count are those who outnumber them a hundred to one—the women who are at the great business of founding and filling those natural social centres which we call homes."

Much interesting information, many striking thoughts and convincing arguments fill the other 240 pages of this most readable book by a writer who has repeatedly proved her exceptional ability to discuss, in an exceptional manner, the complex problems of to-day.

THE SURGICAL CLINICS OF JOHN B. MURPHY, M. D., AT MERCY HOSPITAL, CHICAGO. April, 1913. Published Bi-Monthly. Philadelphia and London: W. B. Saunders Company. 1913. Price per year, \$8.00.

This volume of the Murphy clinics follows very closely the lines laid down by the preceding numbers. The variety of surgical material presented is testified to by the following list of cases presented: Hysterectomy for Essential Uterine Hemorrhage, Pyloric Ulcer, Duodenal Block, Duodenal Ulcer, Gastric Ulcer, Cecal Fistula, Pericolitis, Brachial Paralysis, Spina Bifida, Fractured Vertebra, Ureteral Calculus, Cerebellar Tumor, Osteomyelitis of the Tibia, Fracture of Tibia and Fibula, Periosteal Sarcoma, Chronic Trochanteric Bursitis, Recurrent Appendicitis.

It is interesting to note, in the various reviews that have been published, how constant is the criticism regarding the careless editing of these clinical reports of Dr. Murphy. The tendency is to hold Dr. Murphy himself responsible for this defect. It would seem, however, that the various reviewers are rather more captious in pointing out minor faults than in sounding the psychological depths of the Murphy monographs. Never in recent American literature has any product more clearly substantiated the doctrine that "the style is the man" than do these clinical reports. The editing is not above criticism; but an unusual capacity to refer to clinical facts and details noted in cases examined years ago, a broad, well-defined conception of sound, surgical philosophy, and an almost overwhelming evidence of energy, enthusiasm and restlessness predisposes the intelligent reader to the feeling that he is under the influence of a master-mind.

THE INTERPRETATION OF RADIUM. Being the Substance of Six Free Popular Experimental Lectures Delivered at the University of Glasgow. By Frederick Soddy, M. A., F. R. S., Independent Lecturer in Physical Chemistry and Radioactivity in the University of Glasgow. With Illustrations. Third Edition, Revised and Enlarged. New York: G. P. Putnam's Sons. 1913. Price, \$2.00.

Very few medical men are so erudite in their knowledge of physics as to be able to understand the highly technical language in the description of the properties of radium as given in the usual articles upon that subject. This work by Prof. Soddy is a non-technical interpretation of the physical and chemical properties of radium and of other radio-active bodies; hence, the thought that is derived from reading these interesting pages is that here at last the medical reader will derive profit on account of clearness, directness and the use of language unhampered by the array of technical terms which most writers, in describing the intricate action of this metallic element, think absolutely neces-

sary. This is an asset for every book, but especially in the case of one that deals with radium; and, when we write in praise of this work, we do so because it is illustrative of the fact, so often opposed by writers, that intrinsic value is really enhanced when the writer's good sense stands him in good stead in giving an exposition of his subject in terms that may be understood by others than those who specialize in a certain line of study.

GOLDEN RULES OF GYNECOLOGY. Aphorisms, Observations, and Precepts on the Proper Diagnosis and Treatment of Diseases of Women. By George N. Norberg, M. D., Kansas City, Mo., Professor of Diseases of Women and Clinical Gynecology, University Medical College, etc. etc. St. Louis: C. V. Mosby Company. 1913. Price, \$2.25.

The attempt on the part of even the most experienced to formulate definite rules for the diagnosis and treatment of gynecological diseases seems, at first thought, courageous, if not preposterous. The reviewer cannot deny that he opened this little volume in the expectation of finding many assertions and "rules" made with too much positiveness and not enough discrimination. He is willing to confess, however, that he did not find one statement of importance with which he is not willing to agree, and also wishes to call attention to the amount of its information, good advice and valuable warning. Its careful perusal could be most sincerely recommended, if the endless and entirely unnecessary repetition of the words "remember" and "don't" would not render the reading of a few consecutive pages so very tiresome and irritating. It might be possible to improve the book in a second edition in this respect. At that time a few misprints could be eliminated (*e. g.*, peritoneum for perineum), and some hints added, concerning cleanliness during examination, frequency and effect of masturbation, and the care necessary to avoid the production of abortion by the use of instruments when the patient carelessly or intentionally gives wrong information concerning her last menstruation. It also would seem possible in some chapters to arrange diseases in a more logical order.

DISEASES OF WOMEN. A Clinical Guide to Their Diagnosis and Treatment. By George Ernest Herman, M. B., F. R. C. P. Lond., F. R. C. S. Eng., Consulting Obstetric Physician to the London Hospital, etc. etc. Enlarged Edition, Revised by the Author, Assisted by R. Drummond Maxwell, M. D. Lond., F. R. C. S. Eng., Assistant Obstetric Physician to the London Hospital, etc. With 8 Color Plates and 292 Figures in the Text. New York: Funk and Wagnalls Company. 1913. Price, \$7.50.

This well-known work from the pen of one of the nestors of the profession reappears, rejuvenated, in its fourth edition. "When an operator," writes the venerable author of this volume, "has performed a particular operation many times in a particular way, the result of such practical experience is to make him more dexterous, and therefore it may be better for him to continue this technique. But it does not follow that his method therefore is to be commended as the best for everybody. Operators all over the world have ever been trying to improve upon the methods of their predecessors. I have not the opportunities which a younger man can have of closely watching the practice of many different operators." He, therefore, asked a younger man, Dr. R. Drummond Maxwell, of the London Hospital, to help in the revision of the book, especially in those parts which refer to the technique of operations. In looking over the changes in this new edition, affecting not only the text and the illustrations but the whole make-up of the work, one can not fail to appreciate the wisdom of Dr. Herman in the selection of his collaborator. Few modern textbooks of gynecology, written by the younger men, begin with so fascinating a discourse of the existing and supposed relations of gynecological diseases to functional disturbances of the nervous system. Surely to have written, say, only the first fifty pages of this book must have required, not only actual experience, but the sort of intelligent observation that alas! is not too often evidenced in the writings of medical men.

ANZEICHEN UND GEGENANZEICHEN DER INTERNEN BEHANDLUNG DES KROPFES. Von Dr. Wilhelm Hagen, Nuernberg. Wuerzburg: Verlag von Curt Kabitzsch. 1913. Price, M. .85.

The chief domain of the internal treatment of goitre are the cases showing evidence of hyperthyroidism. Here a suitable organotherapy is strictly indicated. The same is true, to a more limited extent, of the goitres of puberty and pregnancy, in which the hyperplasia of the gland occurs in response to an in-

creased need for its secretion. In all other cases, operative interference must be seriously considered. It is directly indicated, where the goitre is producing or threatening a tracheal stenosis, or where, by means of pressure on the mediastinum, an intrathoracic goitre interferes with the circulation. Suspected but obscure cases of hyperthyroidism may be cleared up by an increase of the symptoms following the administration of small doses of thyroid extract. This should only be done with the patient under the closest observation. The *x*-rays are useless in goitre of any kind; the same may be said of the various anti-thyroid substances. In the medicinal treatment of exophthalmic goitre, sodium phosphate sometimes proves useful.

The monograph under review presents an interesting discussion of the conclusions summarized above.

TRAITE DU POST-PARTUM. Par Constantin Daniel, Professeur à la Faculté de Médecine de Jassy, etc. etc. I. Généralités—Organes Génitaux. II. Services D'Obstétrique-Hygiène. Principes D'Asepsie. Paris: A. Maloine, Editeur. 1912.

The author of this work, professor of obstetrics in the University of Bucharest, has contributed numerous interesting articles to medical literature, many of which deal with obstetrical topics. Of all the questions considered by him he seems to favor the normal puerperal state. It is this problem which he is now presenting in the form of a larger treatise in four parts, of which the first two have appeared. In these he takes up the general features of the puerperal state, devoting considerable space to a minute exposé of our present knowledge concerning the anatomy of the puerperal uterus. Accepting it as a fact that the normal puerperium is dependent upon proper obstetrical attention more than on any other factor, he speaks with great detail of the proper organization of an obstetrical in-door and out-door service. The rest of the second part is devoted to the problem of asepsis and of a rational hygiene during the puerperal state. In the two following monographs the author will discuss lactation and the milk problem.

APPENDICITIS. Its History, Anatomy, Clinical Etiology, Pathology, Symptomatology, Diagnosis, etc. etc. By John B. Deaver, M. D., Sc. D., LL.D., Professor of the Practice of Surgery, University of Pennsylvania, etc. etc. Fourth Edition, Thoroughly Revised. Containing Fourteen Illustrations. Philadelphia: P. Blakiston's Son and Co. 1913. Price, \$4.00.

This, the fourth edition of Deaver's monograph on appendicitis, although it represents a thorough revision, differs but little from the previous editions. The book is an important volume, both from the standpoint of a comprehensive treatise on diseases of the appendix and from the fact that it is a critical volume in which is expressed clearly and emphatically the personal experience and ideas of Dr. Deaver. It is too bad that such scant attention is paid to those periappendicular and cecal lesions that are so prominently under discussion to-day, and which furnish so much confusion in establishing an accurate diagnosis in case of right iliac pain. It is all the more difficult to account for this oversight, because, in the preface, we find the statement: "Lane's bands, Jackson's membrane, and mobile cecum have successively been invoked to account for symptoms commonly ascribed to chronic appendicitis, which in some cases are not abolished by removal of the appendix. The extent to which they are a factor is still a question of interest."

GEBURTSHILFLICHES VADEMEKUM FUER STUDIERENDE UND AERZTE. Von Prof. Dr. A. Duehrssen in Berlin. Mit 43 Abbildungen. Zehnte, verbesserte und vermehrte Auflage. Berlin: Verlag von S. Karger. 1913. Price, 5.60 m.

While in size resembling our quiz-compends, and similarly having been prepared especially for the student, a German vademecum like the above in no other way resembles our short treatises which attempt to give to the student, within the space of a few pages, all the knowledge necessary to prevent him from failing in a written examination. This type of German book condenses the material by a most painstaking elimination of all that is only of theoretical interest and of no practical advantage. By the use of type which is almost too small, enough space is gained for the most detailed consideration of all important methods of treatment and even for a very clear and useful description of all obstetrical operations, further elucidated by good diagrammatic illustrations. Duehrssen's short treatise is in its tenth edition, twenty-three years after its first publication, and this certainly proves the survival of a deserving textbook.

THERAPEUTISCHE TECHNIK FÜR DIE ÄRZTLICHE PRAXIS. Ein Handbuch für Ärzte und Studierende. Herausgegeben von Prof. Dr. Julius Schwalbe, Geh. San.-Rat. Mit 586 Abbildungen. Dritte, verbesserte und vermehrte Auflage. Leipzig: Verlag von Georg Thieme. 1912. Price, 24 m.

Excellently encyclopedic is the only fit phrase with which to characterize this volume properly. In the compass of a thousand odd pages, the technique of practically every type and variety of therapy—medical, mechanical and surgical—is dealt with in clear, concise and adequately illustrated fashion.

Naturally, it is fairly impossible even to attempt a critical review of such a mass of material; and yet the reviewer recognizes that he can, in part, signify the value of a book such as this by expressing the opinion that it constitutes a most valuable part of a working reference library.

DIE KLINIK DER TUBERKULOSE. Handbuch der gesamten Tuberkulose für Ärzte und Studierende. Von Dr. B. Bandelier, Chefarzt des Sanatoriums, Schwarzwaldheim in Schoenberg bei Wildbad, und Dr. O. Roepke, Chefarzt der Eisenbahnheilanstalt, Stadtwald in Melsungen bei Cassel. Zweite vermehrte und verbesserte Auflage. Mit 3 Abbildungen und 7 Kurven im Text, sowie 6 farbigen und 2 schwarzen Tafeln. Würzburg: Curt Kabitzsch. 1912. Price, paper, 13.50 m.; cloth, 15 m.

The reviewer's opinion of the excellence of the first edition of this work in the *JOURNAL*, June, 1911, seems to have been shared by the profession, for a second edition has been made necessary in less than two years. The work has been carefully revised and many additions made. Among these are several colored plates, likewise a chapter on psychoses and their relation to tuberculosis. The newer work on the surgical procedures in pulmonary tuberculosis, especially the question of artificial pneumothorax receives detailed consideration.

PRAKTISCHE ERGEBNISSE DER GEBURTSHILFE UND GYNAEKOLOGIE. Herausgegeben von E. Bumm, Berlin, A. Doederlein, München, K. Franz, Berlin, und J. Veit, Halle. V. Band. I. Heft. Wiesbaden: Verlag von J. F. Bergmann. Price, 5 m.

This first number of the fifth volume contains contributions to problems which at the present time interest obstetricians to an unusual degree. Lamers considers the methods available for the purpose of ascertaining the pathogenical character of streptococci in lochial secretions. The striking fact, that in Germany the birth-rate at present shows the same decline as has been noticed in other European countries is discussed by Thorn, Gräfe and Veit, the latter speaking, in general, of the causes of a reduced fertility. The latter author also contributes an article on early rising after childbirth and operations. There is a paper by Krömer on plastic operations for complete and total defect of the vagina. This interesting number also contains a very instructive article on the value of vaginal anterior hysterotomy, both in gynecology and obstetrics.

THE TREATMENT OF DISEASE IN CHILDHOOD. By G. A. Sutherland, M. D., F. R. C. P., Physician to Paddington Green Children's Hospital, and to Hampstead and North-West London Hospital, etc. etc. New York and London: Oxford University Press. Price, \$3.75.

The second edition of Dr. Sutherland's manual contains new sections on the acute infectious diseases, and on diseases of the skin. These subjects are treated in the author's clear, succinct style, and there is a vast deal of information condensed into rather small compass. Dr. Sutherland's work is a preeminently personal one, and his therapeutic suggestions are based upon long experience. It is apparent, that Sutherland is a great believer in drugs, because he gives specific directions for their use, and uses drugs freely.

Medical men, desiring a clear though condensed manual of diseases of children, will find this book of decided value.

DIE REZEPTSAMMLUNG DES SCRIBONIUS LARGUS. Eine kritische Studie. Von Dr. phil. Wilhelm Schonack. Jena: Verlag von Gustav Fischer. 1912. Price, 3 m.

This small brochure represents a critical study of the work of Scribonius. It is divided into three parts as follows: The author, his work, translations and commentaries. Regarding biographical data, Schonack is obliged to content himself with the meagre statement that Scribonius probably lived during the early part of the first century A. D.

Small as is this volume, it must be classed as a reference book, for it is so filled with minutely accurate data that to take it up casually, in the hope of acquiring its full value, would be doing the author a great injustice.

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EDITORIAL.

THE PERENNIAL SUBJECT: DETERMINATION OF SEX.

Let us take it for granted that there is no more interesting subject than the causation of sex and let us take it for granted that all books and essays on the subject are epoch-making. But even admitting all this with a willingness that should merit applause from the critical and non-critical, why is it, may we ask, that although so much time and study have been given the subject, there is as yet no solution in sight, and why is it that each investigator has a pet theory that is at daggers drawn with every other pet theory? Surely, when investigations are being prosecuted along the same lines, it would be within the bounds of reason to hope that at least two men would have slightly germane thoughts, would hold hands in common fellowship and illustrate to a weary medical public the beauties and advantages even of a partial consonance. But perhaps we are too critical, too hopeful, too exacting; and that we must be all these is evidenced in the latest publication* on the subject, for therein we read that what we had been taught to consider as the real cause of sex—we were about to make the unpardonable mistake and write 'causes'—was very false knowledge indeed, and must be cast aside at once if we wish to be brought into a greater light, if not the greatest light that has yet been shed on this baffling problem.

Thus having been cleansed of the theories of Schenck which were embodied in his trumpet-blast article, "Meine Methode der Geschlechtsbestimmung," and of the belief that the right ovary is masculine and the left feminine as shown most conclusively in E. Rumley Dawson's "The Causation of Sex," the reader will be in a receptive mood to digest to the full the theory which Dr. Reed advances with the historical cocksure-

*Sex: Its Origin and Determination. By Thomas E. Reed, M. D. New York: Rebman Company. 1913.

ness of all writers on this subject. And what a simple theory to understand, how it insinuates itself into the inmost recesses of one's reasoning powers! Cloudland is forgotten for the nonce, and Nature with her tidal ebb and flow is made the foundation of the idea that parturition is subject to a tide cycle—a positive one covering six hours followed by a negative one covering the same time. The average period of labor for primiparæ being eighteen hours and for multiparæ almost twelve hours, both are divisible by six, that is in the first we have three tide cycles—positive, negative and again positive, while in the latter we have but two—positive and negative. Suppose a primipara starts labor pains in the positive cycle, she then passes into the negative, and soon greets the positive again. But the multipara goes the primipara one better, since her period of labor covers only two cycles—positive and negative. Now with all this fully understood, what could be easier than to grasp the simplicity of the theory of sex determination! Just as labor is divisible into positive and negative tide cycles, so must sexual union be practised during the positive hours if a boy is desired or during the negative hours if a girl is craved. What the result would be if the impregnation took place just at the point where the positive hours become negative is not stated, but probably a hermaphrodite would result. Or perhaps either an effeminate man with from 20 to 30 per cent. of feminine qualities or a masculine woman with a like amount of masculine qualities. Shade of Otto Weininger take note!

Whenever the writer of these lines reads a new tract on sex-origin determination, he invariably takes down from his bookshelf that most naïve but highly instructive work, "*L' Art de procréer les sexes à volonté ou Histoire Physiologique de la Génération Humaine*" by Jacques-André Millot, Bachelor of Sciences and Letters, Member of the former College and Royal Academy of Surgery, of the Paris Academical Society of Sciences, of the Academical Society of Medicine of Montpellier and Paris, etc. etc., and which was published in Paris in 1828. And diversion of no common order is his reward. Being the precursor of Dawson in the belief that the right ovary "supplies boys and the left girls," but not so confident that the ovaries can be depended on unless assisted by the parties interested in the sex of the future child, Millot gives the following instructions, entrancing on account of their simplicity: *C'est le dernier mouvement de la femme qui détermine le sexe; c'est le côté sur lequel elle s'arrête au moment de l'éjaculation qui fournit le sexe toujours masculin lorsque la femme est plus inclinée sur le côté droit que sur le côté gauche et vice versa* (it is the last movement of the woman which determines the sex; the side on which she rests at the moment of ejacula-

tion which will result always in the male sex when the woman is more inclined to the right side than the left and vice versa).

After reading these easily carried-out instructions, would one be justified in frittering away one's time praying to the gods without cessation to make Schenck's diet effective, Dawson's blind belief in the gender of the ovaries a verity, or Dr. Reed's positive and negative hours a surety? Verily, no.

MEDICAL EDITORS AND THE NEWSPAPERS.

In a recent issue of the *Journal of the American Medical Association* an editorial writer bewails the fact that our daily papers are sadly lacking in a very necessary adjunct—a medical editor. The writer cites a number of instances which show unmistakably that without a medical editor the press will continue to make glaring and ludicrous mistakes, and thus, instead of enlightening the public in a satisfactory way, be the means of disseminating the wrong sort of knowledge. Now the point taken by the writer cannot be condemned, for almost daily we are brought cheek-by-jowl with wrong statements as regards diseases; but, even so, is it not demanding too much of our daily papers to ask them to burden their office with a medical editor? We say 'burden,' for the simple reason that our morning and evening papers are conducted in a very modern way—in a business way that takes small cognizance of editors, be they literary or medical. In fact, were one patient enough to gather statistics one would soon ascertain that it is the proprietor or the business manager or the advertising manager whose name inspires respect, and not the mere penny-a-liner (!) whose literary training should insure him at least mention on the front page as being the real editor. Of course, there was a time when our daily papers were edited in the best sense of this much-maligned word, but those halcyon days are over, and the fattest letters are given to the proprietor's name, and also the fattest salary, just because our supineness grants him that gift of gifts according to the American idea—executive ability. Surely in no other country has executive ability—whatever that may mean—occupied a higher niche than in the estimation of the American people.

Granting that what has just been said is without a flaw, why should it ever occur to the proprietor or the business manager or the advertising manager that a medical editor is necessary? And, moreover, are not the proprietor and the business manager and the advertising manager taking their cue from the medical press? How many medical journals are edited by men who know what constitutes editorship? Could not the

number be counted on our ten fingers or, when critical, on our five? And if this is the case,—and we firmly believe it is, for how could it be otherwise when business managers and advertising managers are so decidedly to the front in medical journalism,—would not a bit of cleaning in our stables be the first step toward setting an example for newspapers in the matter of the advantages of having a medical editor?

Of course, such gross errors as appear in newspapers rarely creep into medical journalism: this would be outrageous, indeed, and declarative of a laxity that would not be tolerated even by the slipshod medical reader. But there are many other errors which do get into the columns, not only once but many times; and these are barbarities of speech, grammatical contortions, ignorance of foreign medical literature—here, of course, we must not include German medical literature, since, according to American medical journalism of to-day, there is no other literature of a foreign brand that is worth while—and a total indifference to literary form. In fact, it happens none too rarely that the English that is used is so commonplace that to expose it to the light of day is indeed a cruel act; for even the reader, who can not differentiate any too well between journalese and classical English, who browses delightedly on books that make no serious attempt at purity of speech, cannot fail to recognize how decidedly below the usual standard of diction is our ephemeral literature.

Perhaps, when we have journals in this country that can hold their heads high in the presence of the *Lancet*, *British Medical Journal*, *Practitioner*, *Dublin Journal of Medical Science*, *Universal Medical Record*, *Paris Médical*, *Æsculape* and *L'Hygiène*, we shall be in a better position to dictate to newspapers; for then all that will be necessary will be to lay before the proprietors or managers the open pages of our journals to illustrate what real editorship amounts to. But to-day, alas! that cannot be done, what with our own proprietors and business managers and a staff of physicians too busy with their practice to read widely or to bother about the real literary value of the contents of their respective journals.

OPINION AND CRITICISM.

THE CASE OF DR. FRIEDMANN.

Whether or no Dr. Friedmann's serum is all that he said it was is not the underlying motive in the writing of this opinion and criticism; but what really prompted the writer was the thought that we Americans are an exceedingly inconsistent people. We flaunt our ideas of personal liberty in the face of the whole world, and when the whole world is entranced by our ideas we display a narrow-mindedness that is unequalled in any other country. In fact, we cannot understand that any foreigner should entertain for one moment the thought that personal liberty is a growth peculiar to this country, though in the privacy of our homes we expatiate on the subject, and in all public places and in the press we make it the foundation of all our cherished ideas. Now it is a fact that when you engage a foreigner, who has never been in this country, in conversation, the burden of his talk is that the most pleasurable factor of living in the United States must be that here one can exercise personal liberty to a considerable degree and thus stand before one's judges, not in fear of being maligned, but with the thought that at last a haven has been reached that wots not of prejudice, of petty wrangles, of all those gossipy tidbits that, despite their apparently innocent exterior, are born of slander. But with what unseemly hurry we resent such ideas, how we storm at him for his gross misinterpretation of American ideals, how we destroy his delusions directly he visits us and dares to implant in our soil the thoughts and hopes of his imaginary Promised Land! And especially are we indignant past reasoning when he feels that having commercial instincts his proper *milieu* is the United States where, he has always heard, a man who accumulates money is a figure in civic life and a power for good. Yes, indeed, directly anyone of foreign birth reminds us, no matter how gently, of the fact that the two salient features of American life are commercialism and personal liberty, we not only become dumb with amazement, but the gritting of our teeth is quite horrible to hear. Not that we are ashamed of what must be apparent to all good Americans; but, even so, does this lessen the heinousness of the crime perpetrated by a foreigner?

To show that the puerile treatment accorded Dr. Friedmann was in line with what we have done in the past, all that is necessary is for the reader to re-read, in the columns of the daily press, our attitude toward Sarah Bernhardt some thirty years ago, our hypocritical puritanical attitude, be it emphasized here; also our treatment of Maxime Gorky, Wil-

liam Watson and numerous others who came to us in the past only to be disappointed with the lack of personal liberty that characterized our free country. What was not the incalculable harm done these personages by our mental littlenesses, the cue for which came from a sensational press and was thirstily gathered up by many parched lips belonging to that ilk of so-called moral folk who imagine that they can hide their own peccadilloes when they shout loudest. Who can forget the silly railings of the preachers against the Frenchwoman, the warnings of eternal damnation if any of the *unco guid* went to see her, our moral upheaval when Maxime Gorky visited us as a literary man but failed to bring a clean matrimonial sheet, our harrying and persecuting of William Watson, the English poet, because he had written a poem that had been criticised in England—namely, “The Woman with the Serpent Tongue”?

We hold no brief for Dr. Friedmann nor for the others who have been the victims of a daily press that believes in the belittling of all personages so that *le roi* [the public] *s'amuse*. But we do hold a brief for the decencies which are part and parcel of advanced civilization. And those decencies do not include bogus interviews, falsified statements, attacks on the moral shortcomings of others so that our own smugness can be intensified. Dr. Friedmann may be made of very poor clay, but the attitude both of the lay and medical press toward him would not indicate that we need be any too proud of our own Parian marble.

LITERARY NOTES.

After finishing M. Camille Mauclair's “De L'Amour Physique” (Librairie Paul Ollendorff, Paris), it occurred to the writer of this criticism how inferior we Anglo-Saxons are to the French when in our books we wish to express that degree of candor that must obtain if we desire to present, for the reader's instruction, a truthful account of a subject. Perhaps the French are more refined—their language certainly is—or perhaps they are masters of truth, which we certainly are not; but though it be one or the other of these, the fact remains that when they write on a subject that our Anglo-Saxon prudery and hypocrisy have tabooed, they do so with a virile pen and in the open air, so to speak. They are not ashamed; but who of intelligence would to-day say they are so immoral that their sense of shame has left them? And when writing on certain subjects, is it not really better to be truthful than to do as we of the English tongue do with rare exception—write as if we feared the criticism of our friends, aye, as if we feared even the condemnation of our enemies? With these thoughts in mind we would gladly recommend the book under consideration to all the American societies that have engaged in social and moral prophylaxis, but have withheld, on many occasions,

just what this Frenchman is not ashamed to admit—namely, that sexual intercourse is an integral part of our mundane existence, and that, furthermore, prostitution is not due to low wages, to a desire for finery, but to the desire of the male to exercise his rights. Now we can talk until doomsday that the male should curb his desire and that if this is done the female will be protected; but all such advice is futile in the face of the fact that the male will continue to think that he alone has the right of jurisdiction over his sexual powers, and that, being the superior of the two sexes, he is the one with the sexual desire that must be gratified, whereas the female, being a lesser being, is deprived of any desire; hence, just as he rules in the marts of commerce against all opposition, so his sexual life must not be interfered with by a lesser being. In short, in M. Camille Maclair's opinion, prostitution is the result of the war of the sexes—the desire of the male to conquer by reason of what he supposes to be his superior gifts. If what has just been written does not completely clarify the subject to the reader, let him read the chapter "*Le Duel de l'Homme et de la Fille*" (The War Between the Man and the Girl); and if he does not agree with the author, then indeed he had best continue to attend the meetings of his local society for social and moral prophylaxis.

As medical men we may disagree with some of Ellen Key's theories, but as medical men we must admit that she handles a trenchant pen. But granting this is not granting this gifted woman all that should come to her in the matter of praise, for with the asset which we have mentioned she combines a judgment that is well-balanced, a sincerity that cannot be questioned, and an endeavor at reform that must be an incitement to all women to make their lives really worth living. When Ellen Key writes on any subject she invests it with something new, something that bespeaks an individuality that is so far above the ordinary that every intelligent reader must pause in admiration of the masculine qualities of her mind. But we doubt if the gifted Swedish authoress has ever had in all her books a subject more to her liking than the heroine of her latest book, "*Rahel Varnhagen*" (G. P. Putnam's Sons, New York), for in the character and mental equipment of this brilliant German woman, who was born in 1771,* are to be found the qualities of head and heart which proclaim her the possessor of the best attributes which go to the making of a leader in the movement for the emancipation of woman. Esteemed almost at her full worth by that prince of mordant and saturnine critics, Carlyle, admired by Goethe, not in the way he admired Frau von Stein and the hegirl that made up his court at Weimar, but on account of her "*Letters*" which to him indicated the literary grace, the philosophy, the originality of an extraordinary intellect, it cannot be said that her life was devoid of days of appreciation; but though her position as a social figure was assured in the society of Berlin, her real worth as a

literary woman on account of her "Letters" and her 'advanced' ideas on the subject of the woman movement was not measured as it should have been. But this was a fault of the times, not of the woman; and to rectify any past neglect, on the part of her own generation and the generations which followed, is the object of Ellen Key in this endeavor now before us, which, it is needless to mention to any reader who has not neglected her former works, has all those characteristics which make the Swedish authoress stand out boldly by contrast with all other writers on similar subjects. And, again, a woman, such as Rahel Vanhargen, who was placed by that contemner of women, Carlyle, above Madame de Staël, needs no further introduction to English speaking readers.

Those medical men, who have read Otto Weininger's "Sex and Character" and are still sufficiently interested in this strange genius to learn more of his theories, will find quite a number of readable pages of the illuminating sort in the brochure which Carl Dallago has written on "Otto Weininger und Sein Werk" (Brenner-Verlag, Innsbruck). In these talkative and controversial days in which the rôle of woman seems to be the obsessing thought, it would not be amiss were the advocates of the emancipation of woman to read the remarkable words of Otto Weininger on this subject. Whether or not we agree with him that only when both man and woman cease to need each other in the sexual sense will the complete emancipation of both take place, that only when woman is no longer subjectively the sexual mate of man will her purity be what it should, her mentality in full bloom, the fact remains that Otto Weininger's mind embraced some of the most original thought of our day on matters which concern mankind. Visionary he was, but even a visionary can teach us something if we will but take the best of his teachings. At least, this much can be said of this German philosopher of crotchets and vagaries, of impracticable ideas and revolutionary theories, that his one aim was to teach us a higher morality than we practise to-day; and though to achieve this he reached out into the land of shadows and fâta Morganas, no one can doubt his sincerity and the high purpose of his one great work.

Those readers who found pleasure and profit in reading Charles Rann Kennedy's "The Servant in the House" and J. K. Jerome's "The Passing of the Third Floor Back" will no doubt find the same sources for their entertainment and instruction in Dr. W. Winslow Hall's "The Peacemaker" (A. C. Fifield, London). But, if there are readers who are a bit tired of the representation of Christ in modern garb and with sentences that fairly drip with modern thought and philosophy, let them not at-

tempt the reading of this play. While Dr. Hall's play outrages the dramatic unities on nearly every page, there are nevertheless enough clever lines to make us think well of him as a dramatist and the three acts read separately are really good reading. But this cannot be done, since it is the author's wish that the play be read in its entirety, that is the three acts successively; and when this is done great confusion must enter the reader's mind. This confusion arises not only from the introduction of characters that are of no importance except as talking automata, but from the fact that the author himself loses the thread of his story. Now this thread, as in all plays that put forth Christ in modern guise, is very thin, indeed, but there is no need for its snapping as often as it does, a fault that is a very grave one especially in a drama. But no doubt there will be readers who will overlook all this and read this booklet only for the religious spirit which pervades its pages. This is of a high order, but what is still better from the reviewer's standpoint is the beauty of some of the lines. The latter are in a number of instances of exceptional power and show that the author is no servile follower of present-day acknowledged writers of blank verse; hence, more's the pity that incongruities and obscurities were allowed to slip into the text, thus marring what would otherwise have been a creditable production.

Those American physicians, who have undertaken a post-graduate course in Germany and then traveled through that country with eyes only half-open and admiration on their lips, should read Lily Braun's brochure, entitled "Die Emanzipation der Kinder" (Albert Langen, Munich). In the twenty-eight pages of the slender volume are packed many ideas of so trenchant and acrimonious a nature that though we might think that the authoress' socialism is at the bottom of her onslaught on the present martinet-like school system of Germany, this is not true, since the statistics which have been published on child suicide in Germany bear out her principal contention. Systematic education of the child has been carried further in Germany than in any other country, and although its good points are numerous, when the consideration is the collective result of unswerving educational methods, in an individual sense we see only too often a reverse side of the picture that is far from humane. The same injustice is done among us in a lesser degree, not because we are more enlightened as to the individual needs of the child, but because we are more lax as regards disciplinary curbing. That the plea for the protection of the child which has come from the pen of that earnest worker on behalf of humanity, Lily Braun, can be read with profit by all, no matter what their nationality, is not overstating facts; for though in English-speaking countries suicide among children is less frequent than in Germany, where inherent in the German character there is, with few

exceptions, a strain of sentimentalism that environment has bred through the ages, there are just as often with us misdirected efforts at compelling the youthful mind to digest what is obnoxious to it, with the alternative of class ostracism abetted by reprimands and even denunciations from parents in case recalcitrance is viewed as a desire on the part of the child to shirk its school work. After reading Lily Braun's startling exposé, one is tempted to regard, in a spirit of censoriousness, any method of education that has for its bedrock that hydra-headed monster—discipline.

The majority of books written on the subject of conjugal happiness—and we include those from a medical standpoint—are very silly productions, indeed; for they either savor too much of narrow-mindedness and a religious bias that become intolerable to the reader, or they are on such old medical lines that even the greatest admirer of progressive medicine is a bit ashamed that first class medical writers should be such poor medical philosophers. In the book before us by Hofrat Dr. L. Loewenfeld—"On Conjugal Happiness" (John Bale, Sons and Danielsson, London) the writing does not come under the above criticism, for not only is the author a thorough student of the subject, but a philosopher of modern tendencies, and so free from bias that even his 'advanced' countrywomen, such as Lily Braun and Adele Schreiber, or the much-criticized Swedish reformer, Ellen Key, would find it difficult to single out any one point that would indicate his lapse into that ancient theory that woman is so inferior to man that her voice in the matter of what should constitute conjugal happiness is a very negligible quantity. But we hasten to add, lest the reader may think this book is of a revolutionary character, that such is not the case; and this being so, we have no hesitancy in recommending its perusal even to the 'puritanical' among our confrères, who may have their own 'fixed' ideas as to how to advise others, but rarely, if ever, follow them themselves. As an essayist of the calibre which the intelligent reader demands to-day in an expositor of any vital question, Dr. Loewenfeld need fear no harsh criticism, for he combines in his person those mental graces without which all writing is dryasdust. But more than this to commend the book is his sense of proportion, his sanity of outlook, and an erudition that never falls into pedantry. In short, we have here just the book we need to-day to make us a little wiser, a little saner, and a little more broad-minded than is our wont when we talk on this subject, and perhaps a little more cultured; for if the experience of others has been that of the reviewer, they must admit that our conversation on the subject of conjugal happiness does not always indicate that the cultural effects of education are any too evident in our supposedly learned disquisitions.

ORIGINAL ARTICLES.

THE MEDICAL ASPECT OF ABDOMINAL PTOSIS.

By N. W. JONES, M. D., of Portland, Oregon.

The general subject of abdominal ptosis has been, during the past two years, so thoroughly discussed from a surgical standpoint that it would seem quite justifiable to set forth the medical aspects of the disease lest we forget that by far the great majority of all people suffering from it must and should be treated from the medical standpoint only. There is, in fact, actual danger that many patients who suffer from the consequences of intestinal stasis may have suspensory or other operations done upon them, when this factor of intestinal stasis can be entirely removed by medical measures and the baneful results of the underlying ptosis entirely removed. The writer will attempt, in the following pages, to discuss the subject in as broad a sense as possible, and to differentiate, to the best of our present knowledge, the medical from the surgical types of the disease.

By the terms 'enteroptosis' and 'splachnoptosis' is understood a downward displacement of the abdominal viscera, individually or collectively, from any cause whatsoever. Pathogenically, two quite different groups of cases may be indistinctly recognized—the acquired and the congenital types—although they merge one into the other in many instances; for individuals suffering from the congenital form of the disease may easily be more prone to develop an acquired type of abdominal ptosis through the action of traumatic and other extrinsic influences.

The first group or acquired type concerns, for the most part, women who have born children, and whose abdominal muscles have become stretched and weakened by the temporarily increased abdominal pressure and later have not regained their tone. The sudden removal of increased intra-abdominal pressure, due to ascites, tumors, etc., may operate in the same way. Rupture of the gastrocolic omentum, with descent of the transverse colon and acute angulation of the bowel at the hepatic and splenic flexures, causing irrelievable intestinal stasis, has been observed to follow the strain of heavy lifting. The same mechanical means has been the demonstrated cause of acute ptosis of the stomach with obstruction of the second portion of the duodenum, with resulting stagnation, and leading to the diagnosis of obstructing ulcer.

This phase of acquired abdominal ptosis will be mentioned later. Landau first emphasized the effect of mechanical influences on the production of ptosis in 1881, and this group of cases is at times spoken of as the Landau type of enteroptosis.

The second type in point of numbers is a much larger group than the first mentioned, and is met with in men, women, children and the newborn, in all races and in all ranks of life. Two main factors seem to enter into the pathogenesis of these cases: First, and possibly primarily, the presence of developmental defects, resulting for the most part from imperfect rotation of the abdominal viscera during embryonic life, and causing imperfect formation of the peritoneal ligaments necessary to the erect posture assumed by man; and, secondly, a condition which may be intimately related with the first—namely, that of an early developing weakness and relaxation of the entire organism. There is a tendency, on the part of some authorities, who have had the opportunity to study the condition from an anatomical standpoint on the operating table, to believe that every instance of the congenital type of ptosis has, as a cause, some fundamental defect of development. Whether this will prove true in the multitude of mild cases remains yet to be demonstrated.

The acquired and congenital forms of abdominal ptosis are frequently found in the same individual. It is interesting to note that the congenital type may not assume a marked degree of prolapse until after the mechanical factors of the acquired form have also operated on it. Some of the most marked instances of visceral dislocation have belonged to this type of the disease and exist without intestinal stasis and without marked symptoms in otherwise physically strong women.

HISTORICAL.

The anatomist Morgagni (1682-1771) in his work "*De Sedibus et Causis Morborum*" first described the anatomy of splanchnoptosis. In the beginning of the nineteenth century Esquirol and other clinicians wrote of the relation between visceral displacements, especially that of the colon, and the development of mental disease. In 1841 Rayer discovered the presence of the wandering kidney and directed anew the attention of anatomists and physicians to this subject. Virchow, in 1853, described visceral displacement due to peritonitic adhesions, and assigned certain abdominal symptoms to it. Then followed rapidly the writings of numerous investigators, especially that of Kussmaul (1880) describing in detail gastropptosis, the works of Landau (1881) on the wandering kidney and the wandering liver, and the epochal report of Glénard (1885) upon the frequent occurrence of enteroptosis and its relation to various general and local symptoms of supposedly nervous origin. Glénard placed the origin of these symptoms upon an anatomical basis in that he believed the starting point of all visceral displacement was found primarily in a relaxation of the gastrohepatic ligament. He

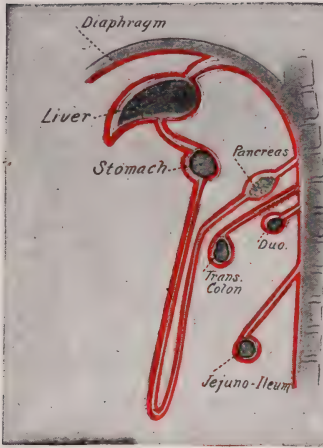


Fig. 5.

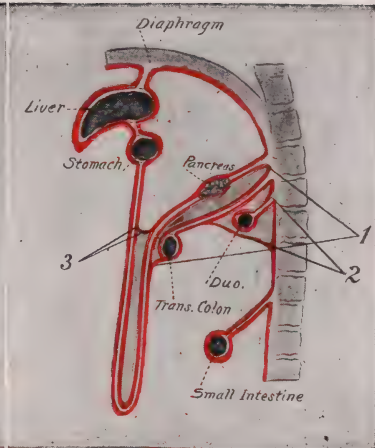


Fig. 6.

Fig. 5.—Schematic sagittal section of abdominal viscera of a cat, after the intestines have been rotated to correspond to the adult human position, to show lines of peritoneal reflexion before adhesion. (Redrawn from Huntington.)

Fig. 6.—Peritoneal arrangement which would be produced by rotation and fusion of the viscera of a cat in the position corresponding to the human. (Redrawn from Huntington.)



Fig. 4.

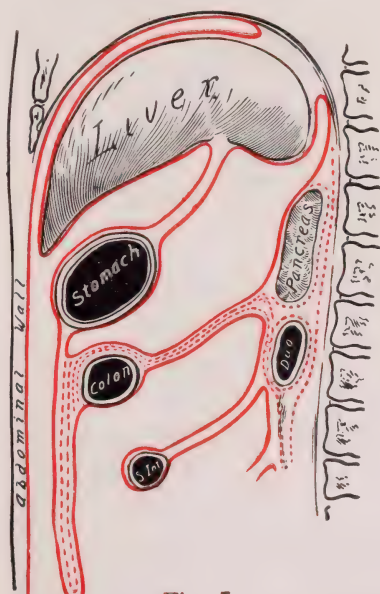


Fig. 7.

Fig. 4.—Area of adhesion between the dorsal mesogastrium and primitive parietal peritoneum in monkey. (Redrawn from Huntington.)

Fig. 7.—Normal arrangement of adult human peritoneum showing obliteration of omental bursa and formation of gastrocolic ligament. Dotted red lines indicate fused or obliterated peritoneal layers.

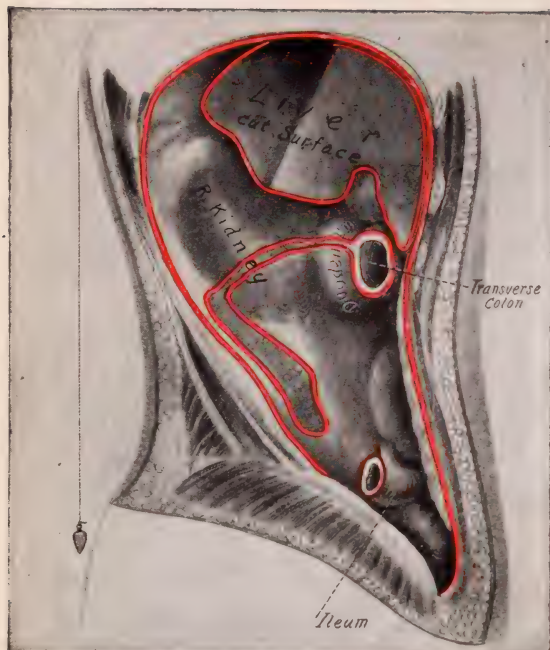


Fig. 8.—Diagram showing normal attachment of the ascending colon, pear shape of normal abdominal cavity, and concavity of normal lumbar spine.

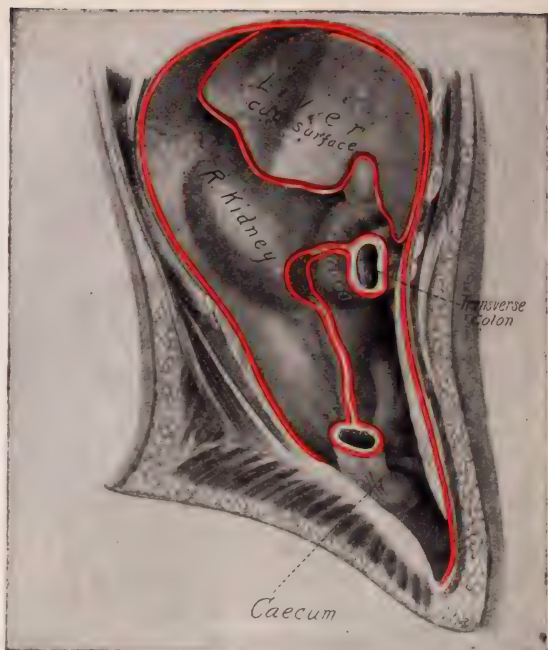


Fig. 9.—Diagram showing attachment of mesentery of ascending colon where rotation and fusion have been incomplete (cecum mobile).

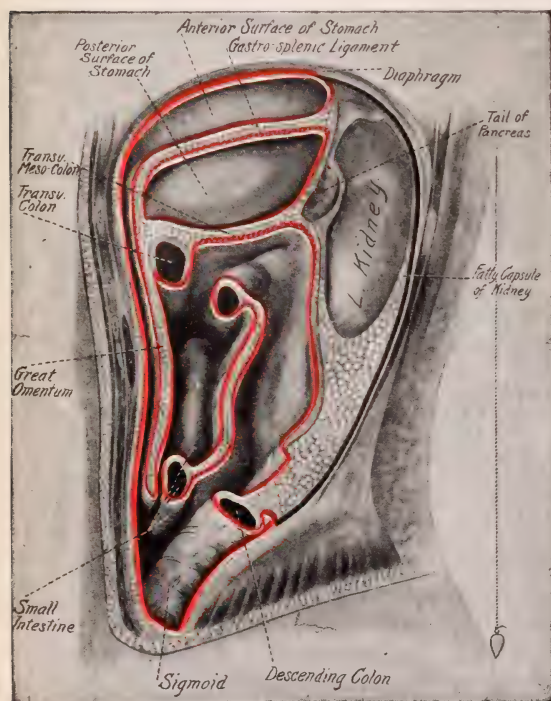


Fig. 14.—Sagittal section through the left side of the abdominal cavity showing the distribution of extra peritoneal and mesenteric fat in a normal individual. Lumbar curve normal, as shown by the plumb line.

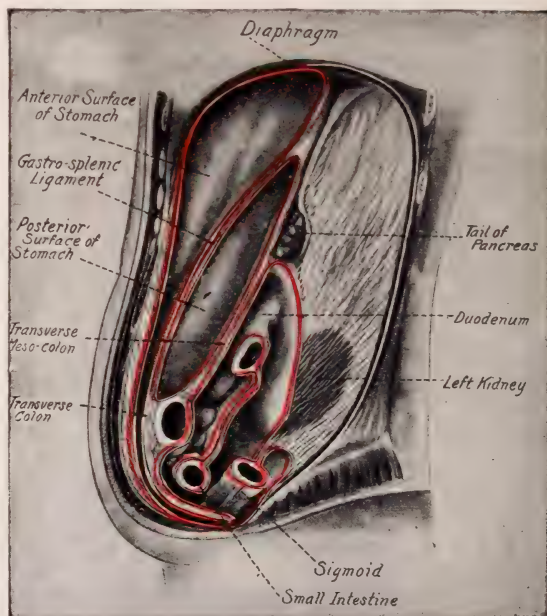


Fig. 15.—Sagittal section through the left side of the abdominal cavity showing absorption of extra peritoneal fat and the letting down of all abdominal organs, constituting a general ptosis. The belly is pendulous and the organs are found chiefly in front of the perpendicular psoas line. The plane of section, instead of being pear shape, as in Fig. 14, is oval. The lumbar curve is gone and the patient has assumed the 'carrying position.' Point of section same as Fig. 14.

believed other peritoneal ligaments would in turn partake of the same process and lead to displacement of their respective organs. A vast array of theoretical writings, which had for their object an explanation of the origin of the disease, followed this work of Glénard, but few were based upon anatomical studies. The brief enumeration of some of these writings is given here. Kussmaul believed that the vertical position of the stomach was the remains of the fetal type. Litten, Ewald, Kuttner and Leichenstern believed that the displacement of the kidneys and other viscera were of congenital origin. Meinert held that injury to the chest through the influence of corsets, rickets, and occupational disfigurements, by reason of the inheritance of acquired characters in succeeding generations, produced the ptotic type. Rosengart believed there existed a congenital *anlage* of enteroptosis. His anatomical studies post-mortem in children indicated that in enteroptosis the fetal position of the viscera was apparently retained. Schatz and Leshaft considered enteroptosis to be wholly the mechanical effect of changing intra-abdominal pressure. Schwerdt, Quincke and Meltzing believed it to be the result of binders and corsets, and that later post-natal adhesions formed to maintain the dislocation permanently. Mathes believed that the elastic pull of the lungs on the diaphragm pulled against the hydrostatic visceral pressure and raised the viscera thereby. The greater the development of the chest the higher was the pull; whereas, in the flat chest of the enteroptotic, very slight upward pull was produced, and this deficiency was increased by the general weakness of the body tissues. Stiller looked upon enteroptosis as the expression of a constitutional anomaly which he termed *asthenia universalis congenita*—a term that is generally used to-day because of its broad significance. Sérégé claimed that there existed an intimate congenital relationship to the development of enteroptosis, even though children do not frequently give symptoms of ptosis aside from the severe constipation that may be present from the beginning. Escherich states that the symptom-complex of abdominal ptosis is usually absent in childhood, although anatomical findings are often very marked. Aufrechts notes the freedom from dyspeptic symptoms on the part of patients suffering with marked scoliosis with displaced viscera. Tuffier believes that there exists a general universal tissue disease which renders the organs physiologically insufficient. Strauss denied the existence of a congenital *anlage*, but claimed that there was the presence of an arrested development, because the symptoms of the ptosis appear for the most part at puberty. He takes no recognition of the greater demands upon the body at this age.

At this stage there appeared again the results of anatomical studies, and these, too, on the part of roentgenologists and surgeons upon the living subject. The work of Holzknecht, Haudek and their pupils, of Jordan, of Guy's Hospital, London, and others, in radiography, and the work of Rovsing, Duret, Lane, Beyea, Martin, Goldthwait and Coffey in surgery are notable.

ETIOLOGY.

In the natural formation and position of the abdominal viscera many factors operate to maintain a balance between position and function. When man assumed the erect posture, a distinct modification of the intra-abdominal supports became necessary. From the study of comparative anatomy it is found that nearly all the abdominal viscera in quadrupeds are suspended directly from the spine by means of individual mesenteries. The liver, stomach, pancreas, and small and large bowels are arranged thus. It is evident that were the ordinary quadruped to assume permanently the upright position, the weight of these heavy organs would be sufficient to stretch out their peritoneal supports and pile them up in the lower part of the abdominal cavity. Therefore, in man a suitable ar-

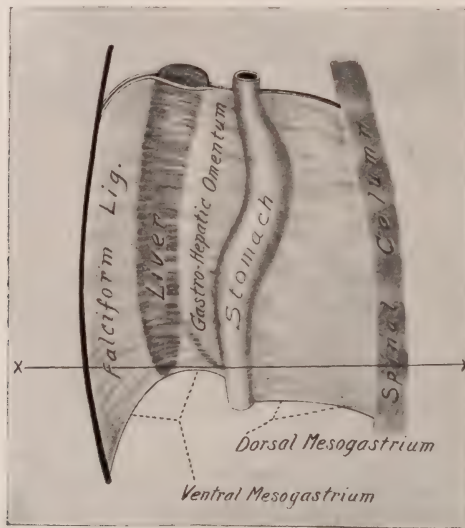


Fig. 1.—Schematic profile view of ventral mesogastrium with developing liver. (Modified from Huntington.)

rangement has been attempted to place sufficient fixed points lateral to the spine itself to help hold these organs in permanent position. The liver is fused with the diaphragm. The stomach has two firmly fixed points: (a) the esophageal end, and (b) the junction of the first and second portions of the duodenum, and it hangs as a hammock between them. The pancreas has become absolutely a retroperitoneal organ fused to the dorsal peritoneum. The duodenum becomes partly retroperitoneal and is fixed by the gastrohepatic ligament at the junction of its first and second portions, and by the muscle of Treitz below. The ascending and descending colons lose their mesenteries, becoming retroperitoneal, and the hepatic and splenic flexures become fixed points. Especially is this true of the splenic flexure. The transverse colon alone is allowed to

swing free; but here also Nature has attempted to add additional support to this organ by dropping the omentum from the greater border of the stomach down over the colon and allowing it to fuse with the peritoneum covering it, and by obliterating the omental bursa. In the man-like apes is found an intermediate type of peritoneal development which occupies a place about midway between the ordinary four-legged animal and man (Figs. 1-7).

Another factor of exceedingly great moment is the shape of the abdominal cavity itself as determined by the spine and the bony pelvis. Wolkow and Delitzin¹ in 1899 called attention to the significance of the paravertebral niches in the maintenance of visceral position, and reviewed

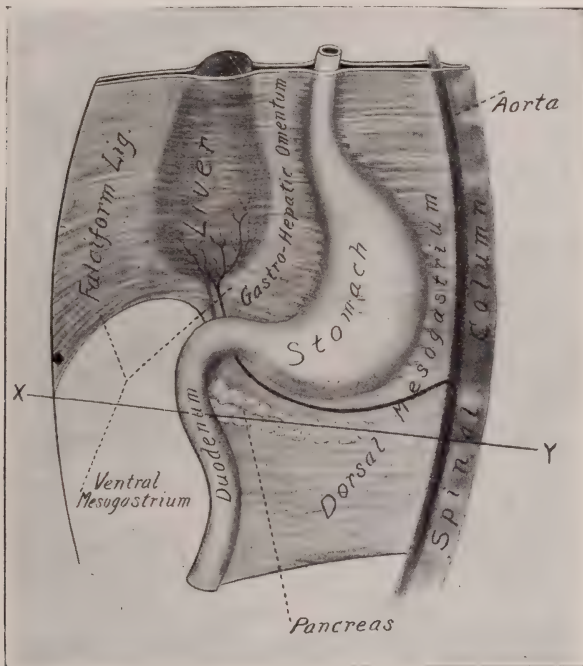


Fig. 2.—Relation of liver, stomach, and pancreas to the mesogastrium just before rotation. (Modified from Huntington.)

the writings of Weisker, Chamney and von Koranyi who had been the first to give the matter any consideration. These authors describe a series of cases in which they took measurements on the cadaver and made plaster casts and molds in both male and female subjects, both in the normal condition and in those in which movable kidneys existed. Their study of the form of the paravertebral niches led to the following results. The niches present a great variety of forms, but this variation shows certain set rules:—

1. The upper section of the kidney niches corresponding to the diaphragm arches shows variations in almost all molds between the right and left sides.

2. In male cadavers the niches are deeper and much narrower at the lower end. Their form is more pear-shaped or conical; the impressions of the muscles are far more distinct (*quadratus lumborum* and *psaos major*), as well as those of the ribs; their upper portion is also wider or broader in molds prepared with the body in a vertical position, but the conditions remain almost unchanged.

3. In the female cadaver where no palpable mobility of the kidney existed, the paravertebral niches in casts made in the horizontal position of the cadaver were well contoured, distinctly narrowed toward the lower end, but not so deep as in the male. In the right niche margins, more rounded, were noted; the muscle impressions were much less pro-

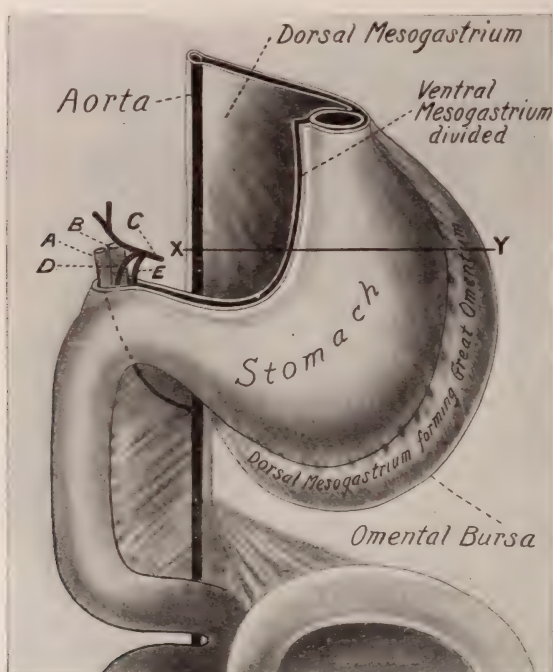


Fig. 3.—Schematic ventral view of stomach, duodenum, and dorsal mesogastrium, after rotation of stomach and extension of omental bursa caudad beyond greater curvature of the stomach. The ventral mesogastrium is detached along the lesser curvature. A, location of hepatic duct. B, portal vein. C, hepatic artery. D, gastroduodenal artery. E, pyloric artery. (Modified from Huntington.)

nounced, especially on the right side. On casts made with the cadaver in the vertical position, the difference between the right and left niche was remarkable. They appear more open, more shallow, somewhat broader from above downward than in the horizontal position of the body, and the contours of the right niche are more rounded.

Coffey,² following the same lines, studied the question of visceral sup-

port by means of plaster casts obtained on the cadaver. He states that if, with the subject standing erect, a plumb-line were dropped from the diaphragm so that it passed through the abdominal cavity at the point where the appendix is attached to the posterior wall, much more than half of the space on that side of the median line would be back of the plumb-line. If another plumb-line were dropped so as to pass along the front surface of the kidney, this line would be 3 in. back of the first



Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 10.—Antero-posterior section through pelvis, appendix and right flank. Plumb line represents perpendicular psoas line.

Fig. 11.—Antero-posterior section through pelvis, psoas muscles and left flank. Plumb line represents perpendicular psoas line.

Fig. 12.—Diagram showing direction and shelf of the normal ascending colon. Arrows indicate direction of intra-abdominal pressure produced by the weight of superimposed organs.

Fig. 13.—Diagram showing pendulous mobile cecum seen where rotation is not complete; also its effect in displacing the right kidney, to which it is attached. Arrows indicate direction of intra-abdominal pressure caused by the weight of superimposed organs.

one; and another line, placed $1\frac{1}{2}$ in. farther back, would touch the posterior surface of the kidney. The attachment of the hepatic and splenic flexures of the normal colon is external to the kidney, and is almost even with its posterior surface. This attachment is 4 in. back of the first line, and passes from the hepatic flexure forward to the cecum or appendix at an angle of 51° with the horizontal. Two-thirds of the right lobe of the liver also is behind this line, and the kidney actually rests

on a four-inch shelf that is heavily padded with fat. The ascending colon lies firmly upon this shelf as well, with a slope of 51° , and is held there by fusion with the parietal peritoneum. The same is true of the descending colon. Coffey's conclusions in regard to the funnel shape of the male abdominal cavity are practically the same as those of Wolkow and Delitzin, but he emphasizes the fact that this funnel- or pear-shaped cavity actually rests on an inclined plane. By actual measurement the area of a cross-section through the abdomen at the level of the lower kidney pole was 44 sq. in.; whereas the area of a similar cross-section at the level of the base of the appendix was 14 sq. in.; that is, the abdominal cavity at the upper level is more than three times greater than it is at the appendix level (Figs. 8-13).

A third factor in the maintenance of visceral position is the question of intra-abdominal pressure. The upper organs of the abdominal cavity rest upon the lower ones in a measure as one cushion upon another. The air and liquid contents of the stomach and the bowel exert a hydrostatic pressure which extends in all directions; but owing to the tension of the abdominal walls the reacting force becomes sustaining in character, with the anterior abdominal wall also directly holding in place the free omentum and small bowel. Important also in the maintenance of intra-abdominal pressure is the question of extraperitoneal but intra-abdominal fat. This fat surrounds and imbeds the kidneys, shortens and strengthens the mesenteric supports, and fills all crevices and spaces with a soft cushiony filling. It is in fact a regulator of intra-abdominal pressure (Figs. 14-15).

From a study of the embryology of the peritoneum of man and other vertebrates, as in the classical work of Huntington on the "Anatomy of the Peritoneum and Abdomen," one learns the method of development of the special mesenteric supports already mentioned. The peritoneum is primarily the primitive lining of the coelomic cavity. It surrounds the primitive gut, on the one hand, and covers the parietal wall on the other. As the differentiation of the primitive gut progresses, and the liver and the pancreas are budded off from it, and the different portions of the alimentary canal become distinguished one from another, rotation of the gut with its primitive dorsal and ventral mesocolons becomes necessary for the sake of room. This rotation follows set lines, and step by step through the development of the peritoneum the formation of mesenteries, of peritoneal fusions and special peritoneal ligaments can be unfolded. The stomach grows backward and rotates to the left; the dorsal mesogastrium elongates, and the left surface of the stomach becomes the anterior surface; the greater curvature which was directed toward the spine turns to the left and downward. The remains of the anterior mesogastrium between the liver and the stomach are carried to the right with the duodenum and form the gastrohepatic ligament. A portion of the peritoneum covering the duodenum becomes fused with the parietal peri-

toneum and this organ in part becomes retroperitoneal. The liver fuses with the diaphragm to a large extent; the lesser peritoneal cavity is formed behind the stomach by the rotation of the latter, and has its outlet behind the gastrohepatic ligament; the large intestine with its mesentery grows upward to the right and then downward, falling back against the parietal peritoneum, lining the paravertebral niches, and becomes fused with it on either side. The transverse colon and the pyloric portion of the stomach alone remain free from the parietal peritoneum to swing by their mesenteries between fixed points. The peritoneum covering the kidneys becomes in part fused with that of the colon and is obliterated. While these processes of descent, rotation and fixation are taking place, the great omentum grows down over the colon, its posterior peritoneal surface adheres to the peritoneum of the colon and mesocolon, and the omental bursa becomes obliterated so that the gastrocolic ligament is formed by the fusion of four contiguous peritoneal layers.

This is the condition found in the normally developed man or woman; but, according to anatomists,³ rotation and fixation of the peritoneal supports do not take place perfectly in one out of every five individuals. That this lack of proper development must have a bearing upon the position of the organs supported is self-evident. As stated before, whether, in every case in which ptosis exists, there is some form of deficient development of the peritoneal supports is yet to be determined. According to Albu,⁴ in a systematic study of 3,400 patients, 21 per cent. of the men and 68 per cent. of the women had more or less ptosis of the right kidney—figures much greater than those of the anatomists. From anatomical studies on the living, surgeons have recognized certain developmental defects of the peritoneum and mesenteries with accompanying subsidence of their respective organs. The most frequent is a right-sided ptosis involving the right kidney, cecum and ascending colon. Coffey states that he has not found a single unilateral movable right kidney where a proper rotation of the colon and peritoneal fusion had taken place. Here the ascending colon may retain an individual mesentery which has its dorsal attachment some distance nearer the median line than normal, and by the weight of the cecum, together with other factors to be mentioned, may drop even into the pelvis to form the condition first described by Wilm as the cecum mobile. In the so-called case of midline ptosis is noted at times an extreme sagging of the pyloric portion of the stomach and the transverse colon, both of which swing quite freely between their fixed points—the lower end of the esophagus and the junction of the first and second portions of the duodenum on the part of the stomach, and the hepatic and splenic flexures on the part of the transverse colon. This condition is oftentimes associated with an actual non-obliteration of the bursa of the great omentum. The failure on the part of the bursa to obliterate removes the added support of the gastrocolic omentum and allows the colon to swing by its own mesentery alone. This condition is

also noted without the presence of a midline ptosis on the part of the stomach; and by the effect of long-standing chronic constipation, made ever worse by the increasing angulation of the splenic flexure, and often by the relaxation of the abdominal walls by means of frequent child-bearing as well, the colon is found piled up actually in the bottom of the pelvis. With this type of ptosis there may be no displacement of the kidneys, and no abnormal mobility of the cecum. Again, subsidence of the descending colon, associated with the formation of a definite mesocolon, is seen at times; but it is much more rare because of the direct hanging of the colon from the splenic flexure, the peritoneal fusion of which is doubly reinforced by means of the costocolic and the gastro-splenic ligaments.

To return to the conformation of the abdominal cavity, marked differences are found in the abdominal cavities of those individuals suffering from ptosis from those who do not. Wolkow and Delitzin found that in cases of unilateral (right) mobility of the kidneys, the asymmetry of the paravertebral niches came out pronouncedly. The niche corresponding to the movable kidney appeared, even in the horizontal, and more so in the vertical, position of the body, to be of cylindrical form, more shallow and with a wider opening below. It appeared as if it were atrophied. The impressions of the ribs and muscles on the molded casts could be made out with difficulty. In the case of bilateral mobility of the kidneys, the deviation from the normal condition was found at its maximum, even in the horizontal position of the body; the paravertebral niches were cylindrical, open below and shallow. The right niche even broadened distinctly downward at its inferior end, and altogether was deformed to such a marked degree that its inability to lodge the kidney was apparent on superficial inspection. Thus is lost our inclined shelf, which passes backward at an angle of 51° from the horizontal and serves as a pedestal for the support of the greater part of those organs lying behind the median plane of the abdominal cavity. When with this fact is coupled the presence of a distinct mesentery for the ascending colon, it is evident that the cecum and colon lose entirely all assistance from these two factors and hang suspended directly by the mesocolon, assisted somewhat by the action of the general intra-abdominal pressure. The same is true of the right kidney and the liver. The cecum and colon placed in this manner have in consequence a nearly vertical uplift for their fecal contents. Stagnation results, which means increased weight in the cecum and increased prolapse. Chronic intestinal stasis is the result, which means chronic systematic intoxication. The latter gives rise to the many varied symptoms about to be described, the loss of appetite, the progressing weakness, the absorption of the intra-abdominal fat. Thus the loss of the fat cushion is brought about, the intra-abdominal pressure is disturbed, an ever-increasing vicious circle is established, and the unfortunate patient sinks into chronic invalidism. Nature tries to

combat the increasing intestinal stasis by relaxing its fixed peritoneal points. The hepatic flexure gives way, and finally the splenic flexure and left kidney become prolapsed as well. Distinct structural changes have taken place also in the body at the same time. The chest becomes flat, the intercostal angle narrow, and the waist-line small; the natural lumbar curve of the spine becomes flattened, and the general appearance of the individual haggard and stooped.

The rôle which the abdominal binder and the corset plays in the production of general ptosis, the writer cannot look upon as being great. They, no doubt, have a certain subsidiary influence when worn by the child who possesses the congenital anatomical disposition to the disease. The fact, however, that women show a ptotic condition much more frequently than men, is not a logical reason that the condition has been caused by binders, for Albu, in his series of examinations of the newborn, found ptosis in 27 per cent. of female children and 4 per cent. of male children; and in children below the age of puberty, he found 44 per cent. of ptosis in females and 11 per cent. in males; in all of whom the question of abdominal binders could not be considered at all. The writer cannot understand why Røvsing⁵ still holds to the belief, as recently stated in this country, that the explanation of the overwhelming frequency of ptosis in women lies first in their misuse of corsets and laces; and, secondly, in the changes which pregnancy and childbirth involve in the intra-abdominal pressure. It would seem logical to believe that the differences in the anatomical structure would play a more fundamental rôle in the development of the disease than these two subsidiary extrinsic factors, although the writer does not deny them a measure of influence. Mackenzie⁶ has recently brought forward what seems to the writer to be a most important subsidiary factor—namely, that with the appearance of localized ptosis, more especially of the right kidney, there is exerted an increasing traction upon the blood-vessels and nerves which narrows the lumina of the vessels, producing passive congestion of the organs involved and disturbance of their nervous mechanism that cannot fail to produce disturbance of function and hasten thereby the progressing general asthenia.

Looking at the causes of abdominal ptosis in the light of these various factors, we would be prone to limit the number of purely acquired cases to those with a normal structural formation and an absence of all developmental defects in which the general ptosis has been produced by the influence of such conditions as repeated pregnancies, the removal of abdominal tumors, ascites, etc., with an accompanying general body weakness and loss of intra-abdominal fat; and to those forms of localized ptosis which are the result of traumatic causes. One would think when one considers the enormous number of people who present some degree of abdominal ptosis—a number far in excess of those who present developmental defects, as shown by the work of different anatomists—that

visceral prolapse does exist without the presence of these malformations. Still, we have the word of good surgeons, who are in the habit of examining the position of all the organs (as a routine) at abdominal operations, to the effect that they never find any degree of right-sided ptosis whatsoever without the presence of some degree of mal-development of the peritoneal mesenteries or ligaments; and who have expressed their belief that all cases in the future will be found conforming to this state. If future anatomical studies demonstrate this as a fact, then acquired ptosis will, strictly speaking, be limited to those cases of midline ptosis and other localized ptoses in which purely outside traumatic causes, such as heavy lifting, injuries, etc., can be shown to be the direct factors underlying them. Coffey has reported in detail the case records of several patients, which belong strictly to this latter group; patients with whose clinical histories and operative findings the writer was intimately acquainted; for instance, the case of a strong, powerfully built man of fifty-nine years, who was in the habit of lifting heavy beer kegs, and who prided himself upon such feats of strength. Gradually there had developed through a period of about two years prior to his examination and operation, a condition of stomach stagnation, with recurring vomiting and great loss of weight, that led to a probable diagnosis of hour-glass stomach. Operation revealed a midline ptosis of the stomach alone that was extreme, and a sharp kink at the junction of the first and second portions of the duodenum. The end-result has been perfect. Again, a case in point is that of a woman whose stomach distress dated back twenty years. Her history pointed to the presence of a chronic ulcer of the pylorus with partial obstruction. About ten years after the beginning of her stomach trouble, while carrying a heavy load of wood in her arms she suffered a sudden severe pain in the abdomen, which caused her to remark that she believed something had ruptured inside. At operation an old rent was found in the gastro-hepatic omentum and another in the transverse mesocolon. Several feet of the small intestine had passed up through the opening in the mesocolon, the lesser peritoneal cavity, and through the opening in the gastrohepatic omentum. The posterior wall of the stomach protruded through the opening in the mesocolon. The stomach was dilated, and there existed a partially obstructing healed ulcer at the pylorus. Because of the fact that the transverse colon swings almost free as a hammock between the fused peritoneal fixed points at the hepatic and splenic flexures, obstinate constipation has occasionally been seemingly found as the only existing cause for marked ptosis of this portion of the colon, with a stretching of the otherwise normal mesocolon and gastrocolic ligament. The most marked cases of midline colon ptosis, however, as well as the most frequent, have been those in which there was the presence of a non-obiterated omental bursa and a failure on the part of the omentum and the mesocolon to fuse. In view of all these facts, it is evident beyond a doubt

that the pathogenesis of abdominal ptosis is a most varied and complicated one.

SYMPTOMATOLOGY.

The appearance presented by the individual suffering from general asthenia is generally recognized at first glance. The patient has the attitude of listlessness and general body weakness. In marked contradistinction to the ordinary neurasthenic, who relates with enthusiasm the manifold details of his illness, this patient states his history only by the aid of close questioning. Goldthwait⁷ describes the marked enteroptotic child in a way which is also applicable to the ordinary enteroptotic adult: "The poise consists of the flat chest with the drooping shoulders, the prominent scapulæ, the spine inclining upward and backward from the lumbar region, with little curve, being almost straight until the upper dorsal spine is reached, when it then bends sharply forward. With this the abdomen is much larger proportionately than the rest of the body, the lower portion being the most prominent; while to palpation and percussion the parts are soft and tympanitic." The body shows a delicate type of construction; the skin is pale, although in case of marked intestinal stasis the skin may be markedly pigmented. The thorax is small and narrow with a contracted lower aperture. The intercostal spaces are wide; the epigastric angle is acute; the subcutaneous fat is noticeable for its absence, and the musculature is poorly developed. Stiller has believed that a floating tenth cartilage was pathognomonic of the asthenic habitus. This is found in the majority of instances, but is not always present.

The general disturbance of nutrition becomes marked even in the young child, oftentimes before the age of puberty. The child is of a more nervous temperament than its stronger built brother. A capricious appetite, a variable constipation with more or less flatulence and colic, oftentimes attacks of vomiting, and easily produced fatigue are frequently noticed. From the age of puberty on, possibly because of the greater demand made upon the body at this time, the symptoms become more marked. Constipation becomes more serious, headaches become more frequent, and as the child rapidly develops in height, the asthenic habitus becomes plainly noticeable. The boy or girl is apathetic, backward in studies at school, and does not take to athletic sports. The hands and feet are usually cold, and later, after more marked intestinal stasis, there is quite often present general soreness and stiffness of the muscles and joints. Glénard, years ago, tried to establish an anatomical basis for these bizarre symptoms of so-called nervous dyspepsia, believing the visceral displacement so often found in these patients to be the cause. However, the fact that in many elderly people there is marked visceroptosis without any subjective symptoms, and also in younger otherwise well-built individuals suffering from the so-called acquired or Landau type of ptosis, in whom there is perfect health and entire absence of intestinal stasis, made it evident that there existed other factors which caused the ex-

cessive nervous irritability and hypersensitiveness of the autonomic nervous system. This led Ewald, Stiller, Mathes and others to insist upon a congenital predisposition to a universal body weakness. To-day, in the light of the recent additions to our knowledge of the subject by means of careful anatomical and embryological study, and by the results of Lane and others in the surgical treatment of severe irrelievable intestinal stasis, we are still unable to say that this predisposition does not exist. It is hard to believe that anatomical deformations of the bony frame, or improper rotation of the colon and peritoneal fusions, are the cause of this general body weakness anymore than that they are the result of this congenital predisposition. It is not to be denied that severe intestinal stasis can produce the subjective symptoms of a general asthenia, either with or without visceral displacement. The writer has in mind a middle-aged patient who has been a victim of a severe general asthenic condition and a nocturnal epilepsy, in whom there has been a most severe type of spastic constipation with periodic attacks of excruciating severe muscular and joint pain. For nearly thirty years a normal bowel function, even for a brief period of time, has been unknown to her, and yet careful x-ray examinations revealed a normal visceral position without local ptosis of any kind. This is a typical case in which Lane would advise short-circuiting of the colon were it not possible to relieve this stasis by medical measures, as has been done. It seems to the writer also that in those cases during the active period of life where ptosis does exist, a vascular stasis, especially of the renal and superior and inferior mesenteric veins, as shown by Mackenzie, and a drag upon the sympathetic nerve filaments, can play as distinct a rôle in the functional disturbance of the abdominal viscera, which leads to the causation of these bizarre symptoms, as a chronic stasis, although probably not so severe a one.

Gastroptosis.—The normal position of the stomach in the average individual is that in which the lower border of the organ reaches about to or a little below the level of the umbilicus, while the lesser curvature is partly covered by the rib margin and the left lobe of the liver. Because the median portion of the stomach swings free between its two fixed points, this position naturally changes by change of body position and by filling or emptying the viscus. A vertical position of the stomach is so frequently encountered in the perfectly healthy person, however, that one may look upon this position as being as normal as the former. This position, however, passes into that where an actual ptosis of the pylorus exists. In general asthenia the frequent condition of pyloric ptosis has been determined by Holzknecht, Grœdel and Haudek by x-ray examinations. This, no doubt, is brought about by a relaxation of the gastro-hepatic ligament and the peritoneal fusion of the duodenum to the parietes. The ordinary gastroptosis is of this type, and exists frequently, not only without stagnation, but with an actual hypermotility. Rosen-

berg⁸ has shown, in a clinical study of a series of patients, that 20 per cent. of the prolapsed stomachs possessed increased motor power, 10 per cent. a normal motility, and 70 per cent. a lessened motility.

Two distinct types of gastropotosis may be described: First, the pyloric ptosis just mentioned, which is essentially a right-sided ptosis, and which, as a rule, presents no distinctive symptoms *per se*; and, secondly, the midline type of ptosis which exists with a corresponding subsidence of the transverse colon and sometimes of the liver. This type of stomach prolapse presents quite frequently the clinical picture of an obstructing ulcer of the pyloric area. Sourness, burning pain, which is often referred into the back, and is relieved by vomiting, occurs in the same periodical manner as seen in ulcer. Local tenderness also is, as a rule, present in the epigastrium to the right or left of the median line. Usually, however, this difference may be noted: The amount of pain does not depend so much upon the character of the food, *i. e.*, acids, as upon the quantity ingested. Also a considerable degree of relief may be obtained by eating while in the recumbent position, and more particularly when lying on the right side. To a less extent the degree of pain is lessened by lying down after eating. This symptom-complex, of course, is not distinctive of the condition, as ulcer of the anterior wall of the stomach manifests itself frequently in the same way. Marked dilatation of the stomach and actual stagnation of the contents may occur, which may give rise to the periodical vomiting of large quantities of partially digested food. All variations in gastric secretion may be encountered, and in 4 out of 7 cases there was marked bleeding. The writer has never found sarcinæ present in the fasting stomach, no doubt for the reason that lying down permits the stomach to empty itself, and this periodical relief of the stasis does not give sarcinæ a chance to grow. The differential diagnosis between this condition and obstructing ulcer depends upon suitable x-ray examinations. Watching the action of the stomach with the screen, one is able to see a bolus of bismuth rise vertically up through the patent pylorus for 2 or 3 in. into the duodenum, see it remain held there for a moment, and then, as the peristaltic wave subsides, see it tumble back into the stomach again through the pylorus which seemingly remains wide open all the time.

There is nothing characteristic in the findings of the gastric secretions in gastropotosis in general. The various forms of hypersecretions, of hyperacidity and anacidity, achylia, heterachylia and true gastritis are all encountered in approximately the same number of instances as in those persons who do not possess ptosis. The one important thing in this relationship of secretional disturbances to general asthenia is their proper recognition, so that they may be taken into account during the treatment of the latter condition.

Coloptosis.—Until recent years the significance of ptosis of the colon as a factor in intestinal stasis has always been minimized. Curschmann

described a series of anomalous positions of the colon, especially the sigmoid flexure, and described variations in their mesenteries or local peritonitic adhesions, as noted first by Virchow, as their causes. We probably owe more to Lane than to anyone else for the more accurate appreciation of the bearing which colon ptosis has upon intestinal stasis, and taken together with the study of Metchnikoff, Herter and others on the forms of intestinal intoxication, this has led to greater interest in this portion of the subject.

Ptoses of the colon group themselves into three main types—namely, right-sided ptosis, midline ptosis, and ptosis of the sigmoid flexure.

Right-sided ptosis involves the cecum and ascending colon as a rule together, although the cecum may be affected alone. Distinctive symptoms of this condition depend upon the presence or absence of local stasis entirely. If there be sufficient local stasis there is experienced local distress in the right groin, oftentimes a sense of dragging, a periodical swelling with or without pain, which is often relieved by massaging the part. Fever is, as a rule, absent, and there would be no changes in the blood-picture as one might find in acute appendicitis. The diagnosis in the past has always been that of chronic appendicitis, and those patients operated on for such have generally been made worse by the procedure. The recognition of the condition is usually made easily and accurately by means of suitable *x*-ray examinations.

The symptoms of midline ptosis of the colon depend, as a rule, upon whether its fixed points, *i. e.*, the peritoneal fusions at the hepatic and splenic flexures, have remained in place or have given way under the stress of the weight of the organ itself and the general weakness and relaxation of the tissues. In those cases where the parietal peritoneal fusions have held, and the colon swings as a hammock between them but sags heavily by reason of the long-standing obstinate constipation, we see the typical picture of extreme intestinal stasis. It is usually that of a slender, undernourished, stooped woman with a contracted upper abdomen, protuberant lower abdomen, pigmented skin, with a careworn and pained expression upon the face; one who complains much of chronic migraine, muscular and joint pains, and general weakness. When this condition exists alone it is due usually to the non-obliteration of the bursa of the great omentum. When, however, the stomach is also involved as a part of the general process, fusion of the mesocolon and omentum have usually taken place, and there may be the added symptoms of bloating, belching, vomiting and pain, due to stagnation within the stomach. As the unfortunate individual becomes weaker and the body tissues become more relaxed, Nature seemingly tends to protect itself by permitting these fixed points to give way. This often permits a resumption of the bowel function, and in certain instances an actual hypermotility takes place. Bismuth meals, which under ordinary circumstances in the healthy individual require from thirty-six to forty hours in their passage through

the alimentary tract, will (in these cases) pass through in from twenty-four to thirty hours.

Ptosis of the sigmoid flexure does not occur nearly so frequently as prolapse of the other two portions of the large bowel, for the reason that the splenic flexure is doubly supported by the normal parietal peritoneal fusion and the addition of the costocolic and the gastrosplenic ligaments, and from this point the content has more or less of a vertical drop, so that gravity aids in the emptying of this part of the bowel even though the descending colon possesses a distinct mesocolon of its own. In individual cases long continued over-distension of the sigmoid, however, may produce a sharp kink at the upper part of the rectum by its falling over into the pelvis. This condition has been definitely described by Lane, Coffey, and others. The symptoms arising from it would be obstinate constipation, possibly the inability to return the water from a colonic flushing in case the water had passed the constricted point, the local accumulation of fecal matter low down on the left side with the formation of a boggy tumor mass, which could be relieved either by drastic purges or high colon irrigation. The subjective feeling of pain and swelling, as in the case of the mobile cecum, may also be present.

The rôle, which bands of adhesions play in the formation of local kinks, especially about the ileocecal junction and the hepatic and sigmoid flexures, causing local stasis, may be mentioned, although it does not belong to the subject of ptosis. The prolapsed cecum is, however, combined with so-called Lane kinks, and these tend to increase both the subjective distress and the stasis itself.

Prolapse of the small intestine in general asthenia should not be overlooked. Mackenzie has shown that an actual vascular stasis in both the superior and inferior mesenteric veins can be demonstrated in marked cases. The resulting passive congestion cannot but lead to definite functional derangement of the bowel. The same can be said of the effect of dragging upon the nerve filaments of the abdominal autonomic nervous system. There can be no reasonable doubt that this factor both adds to the cause of general asthenia and to the subjective symptoms experienced by the individual.

As has been noted in case of the stomach, the same variety of functional and organic disturbances, both on the part of the large and the small bowel, may be found in individuals possessing prolapsed viscera, as are seen in those who do not. Chronic intestinal catarrh and the Schmidt form of fermentation dyspepsia are both met with. The spastic contracted type of colon associated with chronic constipation is the most frequent form found, and the cause of this spastic condition of the colon may be due quite as much to disturbances of the nervous mechanism of the bowel as to change of position; that is, mechanical obstruction is not the only factor which underlies the constipation of general asthenia. All the gradations of so-called spastic constipation into idiopathic mucous

colitis, or those forms of mucous colitis secondary to other local lesions, as an anacid gastritis or a mobile cecum, are encountered. In marked asthenia there is occasionally seen such increased peristalsis and such increased bowel secretion that a so-called nervous diarrhea results, in which no actual inflammatory condition of the bowel can be determined. The importance of this subsidiary phase of coloptosis cannot be over-emphasized because many times the success or failure of treating either the medical or the surgical type of ptosis depends upon the proper recognition of these complications and meeting them in a medical way.

Nephroptosis.—Subsidence of the right kidney has been the most frequent individual clinical finding of abdominal ptosis. The interesting study of Albu on 3,400 polyclinic patients resulted in the following figures: In men there was 21 per cent. of right kidney ptosis and 4 per cent. of left; in women there was 68 per cent. of the right kidney and 11 per cent. of the left; in male children below the age of puberty he found 11 per cent. of right kidney ptosis, and in female children 44 per cent. of right kidney ptosis; in male newborn children there was 4 per cent. of left kidney ptosis, and in female newborn children there was 27 per cent. However, one may question somewhat the conclusions of Albu in regard to existing ptosis in the newborn, for the reason that both the kidneys and the liver occupy relatively lower positions at this time than they do later in life; still the fact remains evident from such a systematic study that various degrees of kidney ptosis are more frequently met with than the anatomical studies of Dwight and others would indicate, if sinking of the kidney depended entirely upon improper rotation of the colon and parietal peritoneal fusions. Only the detailed study of many such cases by *x*-ray examination and by observation of the anatomical relations of the parts as seen during abdominal operations will clear up this point. Longyear has described what he believes to be a special ligament which passes from the hepatic flexure of the colon to the lower pole of the right kidney. It is his belief that the right kidney is pulled down in every case by the dragging weight of a prolapsed colon acting through this special nephrocolic ligament. Coffey logically maintains that this ligament is simply the fibrous remains of the two layers of fused peritoneum between the colon and mesocolon and the parietal peritoneum covering the kidney, but that this intimate attachment of the colon to the kidney is sufficient to allow the prolapsed and dilated cecum and colon to produce the subsidence of the kidney in every case. The writer's experience with clinical material would not permit him to believe that this was so. Many instances are noted where easily palpated right and left kidneys are present without there being a corresponding dropping of the cecum, as shown by *x*-ray examinations.

Four degrees of kidney prolapse are usually recognized (Litten, Ewald, Kuttner): (1) The kidney shows respiratory movement, and the lower pole is felt; (2) the kidney shows a prolapse of the first degree in which

one-half to two-thirds of the organ is palpated; (3) the kidney shows a prolapse of the second degree, in which it is completely felt and allows some shifting of position by the palpating hand; (4) the wandering kidney which is dislocated to such a degree that it remains permanently outside the kidney niche.

The only symptom of distinctive significance that may be attributed to a prolapse of the kidney is the dull ache or pain in the flank and back, which is usually made worse by standing, but disappears on lying down.

Atony of the Esophagus.—Holzknecht and Olbert⁹ have determined by x-ray examinations that an elongated, inactive condition of the esophagus actually exists. This condition, as described by Rosenheim, is characterized by prolonged and difficult swallowing of small boluses of food, which is often attended with the subjective symptoms of esophagus spasm. The swallowing of larger boluses, on the other hand, and especially the drinking of liquids, is attended with less trouble; and when a sound is passed into the stomach it passes with even less resistance than normal.

Rovsing¹⁰ has described elongation and dilatation of the esophagus associated with prolapse of the stomach. Certain of his cases have resembled cardiospasm in their clinical pictures. In one the cachexia was so marked that cancer of the esophagus was suspected (Case XIX).

Hepatoptosis.—Einhorn found a distinct prolapse of the liver thirty times in 804 patients who presented various dyspeptic symptoms. In 41 reported cases operated on by Coffey for marked ptosis, the free border of the liver was found prolapsed eleven times, and adhesions of the omentum to the liver, making the prolapse permanent, was present in 6 of these cases. Subsidence of this organ is found in two conditions: First, in severe general ptosis in which there has been a universal relaxation of all the peritoneal supports and absorption of the intra-abdominal fat; and, secondly, in the extreme type of midline ptosis in which the free border of the liver has been pulled down along with the localized prolapse of the median portion of the stomach and the transverse colon. The symptoms of this condition when present are usually intimately associated with those of the related organs involved.

Splenoptosis.—Subsidence of the spleen is less frequent than of the liver. It occurs mostly in those cases in which there is marked visceral prolapse which has been at least increased by repeated pregnancies, tight lacing, etc. Symptoms, when present at all, are quite similar to those of the wandering kidney.

Ptosis of the Genital Organs.—In the female, retroflexion of the uterus and prolapse of the vaginal walls enter into the general picture of enteroptosis. In those instances in which the psoas shelf is largely obliterated, the cecum and transverse colon, and often the intestines, become in a measure pelvic organs and add further to the displacement of the pelvic structures.

In the male, ptosis of the testicles is frequently seen in consequence of the relaxation of the cremasters and the scrotum.

RELATION OF ENTEROPTOSIS TO OTHER DISEASES.

Lung Tuberculosis.—Rokitansky first called attention to the frequency of lung tuberculosis in those individuals possessing the asthenic habitus. Freund and von Hausemann believe that this relationship has its cause in the shortness and early calcification of the cartilage of the first rib. Rothschild considers that the aperture is still further narrowed by the abnormal lack of mobility of the angle. The Freund operation for apical tuberculosis consists of cutting the first cartilage, allowing the apical part of the thorax to expand.

Reflex digestive disturbances are so frequently associated with lung tuberculosis that patients present themselves many times because of the stomach distress rather than for any lung condition. The underlying cause may be the general asthenia and the labile autonomic nervous system.

Cardiorenal Disease.—The work on the intestinal flora of the large bowel which Metchnikoff has been pursuing for the past number of years is being accepted with increasing favor by other investigators. Metchnikoff has produced definite atheromatous patches in the aorta of young rabbits by feeding them certain bacteria and constipating them. He believes also that he has isolated a micro-organism which is antagonistic to the action of these intestinal bacteria, and by the use of it and much starch in the diet, many symptoms of intestinal toxemia disappear, including that of indican from the urine. He considers intestinal stasis an important factor in the cause of cardiorenal disease and general senility. The marked degrees of heart, vessel, and kidney sclerosis and their results, *i. e.*, cardiac insufficiency, angina, hemiplegia, etc., are, on the other hand, seldom seen in cases of true general asthenia.

Anemia.—Chlorosis occurs frequently in enteroptotic girls who have chronic intestinal stasis. One theory of its causation is that of intestinal toxemia. In the general asthenic patient some degree of secondary anemia is always present, and usually in direct relation to the severity of the constipation.

Ulcer of the Stomach and Duodenum.—Virchow first noted the frequency with which a small-sized heart and narrowed blood-vessels are found in those persons possessing the enteroptotic habitus. This fact has been brought forth as a possible explanation of the frequent occurrence of ulcer of the stomach and duodenum in these patients. Arloings and Kadon comment in a similar way upon the fact that tuberculosis and ulcer are often found at the same time in asthenic subjects.

Cholelithiasis.—Gall-stones are less frequently found in men of the enteroptotic type than in women. In the latter, after repeated pregnancies, gall-bladder disease is especially prone to appear. Various degrees of

stasis of the bile passages incident to subsidence of the liver, following sudden relief of increased intra-abdominal pressure, may be an important factor in this regard.

Nervous Diseases.—For a long time intestinal toxemia has been looked upon as an important factor in the cause of many of the so-called functional nervous disturbances. The object indeed of the successful treatment of them has been in large measure the relief of the toxemia through free elimination. The relation that enteroptosis might bear to these conditions would necessarily be due to its bearing on intestinal stasis. Neurasthenia, hysteria, delirium, acute psychoses and epilepsy are due largely to this form of intoxication, according to such unquestioned authorities as Weir Mitchell, DuBois, Janet, Marie, Kræpelin, Gowers and many others.

Chronic Arthritis.—What has been said in regard to the sclerosis of the vascular system applies as well to the joint structures. Billings, Goldthwait and others have laid stress upon this point in recent years. Lane and Rovsing have commented upon the relief of chronic joint affections seen after the operative removal of severe intestinal stasis.

PROGNOSIS.

Many different factors enter into the question of the response and outcome of enteroptotic patients to treatment. When the asthenic child is more universally recognized and its nutritional and physical needs are properly attended to, there will be fewer adults who go through life presenting the varied symptoms of chronic intestinal stasis. The success of treating general ptosis depends primarily upon the reliefment of this stasis. Herein lies the importance of differentiating between those cases which can be successfully treated medically, those which possess local forms of ptosis with irrelievable intestinal stasis and are distinctly surgical in character, and those cases of the latter group which present distinct complications of a medical character (such as secretional disturbances of the stomach, severe spastic constipation, etc.) and must be just as carefully handled medically after surgery has been resorted to as those which make up the first group. The general aim in the treatment of any case is naturally the relief of the stasis and the restoration of the prolapsed viscera to as near their normal position as possible. In those cases in which various fixation operations have been made use of, this restoration of the normal position has been accomplished very accurately in a large measure. A complete restoration, however, is not necessary in order to obtain good functional results. Patients under proper conditions of temperament and environment can be made entirely well and strong, and be taught how to maintain this degree of health. The success of the medical treatment of the asthenic patient, and also many of those treated surgically, depends not only upon the relief of the stasis, but upon the patient's active and persistent co-operation: his

willingness to learn the principles upon which his cure rests, and his perseverance with it long enough to insure the formation of body habit. To the patient who is willing to assume his share of the responsibility of such a form of treatment, satisfactory and lasting results can be assured.

TREATMENT.

Goldthwait deserves much credit for emphasizing the need of recognizing the type of the enteroptotic child, and the importance of training such a child in proper habits of posture and gymnastic exercise. The goal to be attained would be the development of such children before body deformation and permanently impaired health have taken place. This would be possible without doubt in the majority of instances. Only in those cases in which intestinal stasis becomes irrelievable, owing to serious body deformations or embryological defects, would it be necessary to resort to surgical measures. By pursuing this method systematically many individuals, who later acquire local ptosis of a sufficient degree to demand fixation operations, could be successfully protected from such sequelæ. This statement being true in general, ideal results will only follow when these prophylactic measures are carried out understandingly with the co-operation not only of the parents of the child, but of the school attendants and the public as a whole.

The treatment of the asthenic patient who suffers from the manifold symptoms of the disease consists essentially of the relief of the intestinal stasis and the support of the autonomic nervous system. This in the main means the restoration of the prolapsed viscera to as normal a degree as possible in order to remove all mechanical hindrances to their normal function, and the building up of the physical body as a whole. The principles which underlie the treatment are essentially these: Rest, overfeeding, regulation of the bowel, psychical re-education, and the training in proper posture and those gymnastic exercises which will develop especially the abdominal and back muscles. This plan of treatment should rightly be started in a suitable sanitarium or hospital, where the attendants have been especially trained in the details of this line of work, and where the patient is freed from all outside cares and worries. A modified rest cure should usually inaugurate the treatment, as weight is more quickly added and the bowel is more easily controlled when the patient is at rest. Then, too, the principles of the cure can be daily explained and elaborated upon until they are understood and the patient's determination is obtained to carry them out to a satisfactory conclusion. In the selection of the choice of foods used in the overfeeding, the existence of secretional or organic disturbances of the stomach or bowel should be recognized, and the general principles underlying the relief of these various conditions followed out. When the digestive functions are approximately normal, as determined by stomach examinations and stool analyses from intestinal test diets, the diet takes the form usually of a

butter fat, milk, vegetable type. There is usually less intercurrent distress when meats are largely withheld. It is of value to regulate the daily quantity of food taken by estimating its value in calories from day to day. This is a fairly accurate guide as to the progress of the patient, and shows many times why, during ambulatory methods of treatment, results were not obtained. As a rule, a patient must be crowded to beyond 3,000 calories per day before any definite gain in weight is observed; and oftentimes a patient will take from 4,500 to even 5,000 calories of food without material discomfort. As soon as the patient sees by his daily weighing that he is steadily gaining in weight, he becomes much encouraged and oftentimes enthusiastic in the work. It is not uncommon at all to see a patient under such circumstances gain a pound in weight



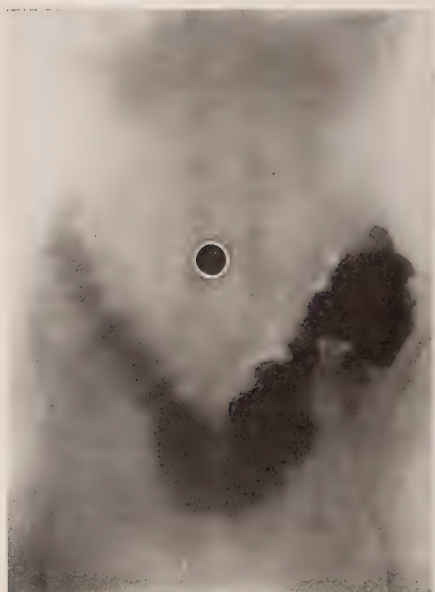
Case I, No. 1.



Case I, No. 2.

a day, and continue to do so for a month or longer. Massage, hot and cold baths and showers, colon irrigation, and hot compresses over the abdomen, may be used as routine, or, when indicated from time to time, to maintain a reasonable degree of comfort for the patient. After a moderate gain in weight has been obtained, the patient should be started in on a course of calisthenics directed toward teaching him the proper poise of the body, correct breathing, and the strengthening of the abdominal and back muscles, as well as the gaining of general increased body tone. Goldthwait has shown by actual *x*-ray examinations that the stomach and the transverse colon are raised a distance of as much as 2 in. through the influence of the cervical fascia upon the diaphragm when the body is held in as tall a position as possible without rising upon the

toes. For the same purpose of placing the cervical fascia on tension, it is well, following a meal, for the patient to lie over a 6 or 7 in. roll, which is placed at the level of the eleventh and twelfth dorsal vertebræ, without the use of a pillow beneath the head. The work of Goldthwait is, the writer believes, of great practical value, for not only does it assist in the restoration of the normal position of the viscera, but gives the patient something tangible to work upon, based, as he himself can be made to believe, upon logical principles. He is thereby placed in the most receptive psychical mood for gain. Probably the most important individual factor, however (as we have seen above), is the placing on of sufficient intra-abdominal fat to increase interabdominal pressure and fill up all of the angles and shelves of the abdominal cavity so that the displaced



Case I, No. 3.



Case I, No. 4.

viscera may be given this direct support. At the same time the manifold disturbance of the autonomic nervous apparatus is made more stable, and the bizarre symptoms of so-called nervous dyspepsia are observed to disappear.

The writer thinks the most important factor in the maintenance of good results, over a long period of time, is the absolute regulation of the bowel. No patient, no matter how thoroughly he may have been built up, trained in and convinced of the logic of the underlying principles, will retain his health if he remains dependent upon the repeated use of cathartics and irrigations for the daily movement of the bowel. The results of intestinal toxemia continue to manifest themselves; he remains dull and discouraged; he is unable to maintain his plan of treatment with-

out great effort, and he soon falls by the wayside. He loses weight; he becomes again weakened, and his bizarre abdominal symptoms return—if they had at any time entirely left him. It has been the writer's experience that every case of chronic constipation can be ultimately overcome unless there is underlying it some local mechanical form of obstruction. Every one of these instances has in his experience proved to be of the surgical type, and that, too, of a more or less severe degree. Unless such local factors are present, the proper systematic use of pulpy foods, especially those like Irish moss and agar-agar, combined with the use of such mechanical lubricants as paraffine oil, and the occasional use of oil enemās, will always prove effective as soon as a moderate degree of intra-abdominal fat has been acquired. When the large bowel is spastic and



Case II, No. 1.



Case II, No. 2.

tender, it is a mistake to feed coarse foods, such as bran or whole wheat breads, bran mashies, etc. The blandest of pulpy foods, those free from all bran, berry seeds, coarse vegetable fibres, etc., which might mechanically irritate the bowel, should be used, and stimulants, salt and other condiments, largely avoided. The use of very hot, moist compresses over the abdomen are of distinct value. Local strappings, belts and various mechanical corsets have not proved to be of much value in the writer's experience. In those cases of general ptosis in which the lower abdomen is protuberant and the anterior abdominal walls relaxed, symptomatic relief and a feeling of support, which is comfortable, are oftentimes experienced. In such cases he usually makes use of plain muslin binders, which are made to fit tightly about the hips and lower abdomen. In all

cases in which there is not this relaxation and corresponding enlargement of the lower abdomen, he has failed to see any benefit whatsoever. Many times the abdomen is flattened and does not project beyond the line of the crests of the ilia. In such instances it would seem worse than foolish to expect benefit from the use of outside abdominal supports.

Given a case in which a suitable gain in weight and body strength has been obtained, and a complete normal function of the bowel restored, there still remains one factor in the successful and permanent cure of the asthenic condition, and that is the complete understanding on the part of the patient of the principles underlying the cure and of his need of persistently maintaining and increasing his newly acquired state of health for so long a period that the body may become habituated to this



Case II, No. 3.

condition. He should understand that whenever through intercurrent illness or accident there is again loss of weight and strength, he must as rapidly as possible return to his high state of health and persistently maintain it.

The writer's association with the work of Dr. R. C. Coffey has completely convinced him that there are occasional cases in which this relief and cure cannot be obtained by these methods alone because of the irrelievability of the intestinal stasis and its results. On the other hand, he is satisfied that there are mild degrees of local stasis, such as the early stages of mobile cecum and midline ptosis, which can be overcome and the patient restored to permanent health without the aid of surgical procedures. The end-results of cases, as shown by x-ray examination after

treatment, may show that the relative position of the prolapsed viscera may be but little raised or benefited, but in spite of this fact good functional results are attained. Therefore, it is safe to say that perfectly good functional results do not depend necessarily even upon a moderate degree of restoration of the prolapsed organs to their normal position.

In conclusion, the writer wishes to thank Dr. Coffey for the use of some of his diagrams, as noted below, and Dr. Ralph C. Walker for his excellent *x*-ray work, which has in a large measure permitted the writer to carry out this study.

CASE RECORDS.*

Medical Cases.—The histories of the following cases of general asthenia with abdominal ptosis are briefly given with the idea of illustrating some of the points emphasized in the paper:—



Case III, No. 1.



Case III, No. 2.

CASE I.—Widow, *æt.* sixty-five, V-para, with hard prolonged labors. From early childhood has been delicate, underweight, and severely constipated. Has suffered intensely from vertical and occipital headaches and neck pains all her life. Twice she has undergone fattening cures under the direction of an eminent internist in the East, but each time quickly relapsed because of the

*In all of the radiograph work Dr. Walker used $2\frac{1}{2}$ oz. bismuth subcarbonate in 8 oz. malted milk. By observations on healthy people with regular bowel function, we determined that the stomach emptied itself well within six hours. By the end of this time the cecum had become well filled with the bismuth, which had first been expelled from the stomach. Within twenty-four hours the cecum and ascending colon were practically freed from the bismuth, and most of it had passed on into the sigmoid and rectum, although enough was usually left in the transverse colon to outline it perfectly. At the expiration of thirty-six to forty hours, the last of it had been voided. In the records of the above cases the degree of intestinal stasis has been determined by this standard.

inability to regulate the bowel. Her condition for years, as regards her general weakness, extreme suffering and sallow, pigmented skin, has presented well the picture of severe intestinal stasis, so graphically described by Lane. In December, 1911, the first *x*-ray examinations were made when her weight was 87 lb. The radiographs reveal a marked midline ptosis of the stomach and transverse colon. There is moderate stagnation of the stomach, about ten hours; but the colon is not freed of bismuth at the end of one week. After the transverse colon had partly emptied itself, a definite kinking of its median portion was found as shown in picture No. 3. This was at first believed to be probably of an irrelievable type, and the writer undertook the task of regulating the bowel with many misgivings. Assisted more or less by very tightly placed adhesive bands, a fairly normal bowel function was obtained in the course of a few weeks. Picture No. 4 was taken in the summer of 1912, when the patient weighed 114 lb. It shows that there has occurred some elevation of the colon and that the median kink has in a measure been removed. The end-result is the



Case IV, No. 1.



Case IV, No. 2.

following: For fourteen months the patient has weighed from 112 to 116 lb. She has not been entirely free from her headaches, but the attacks have been so much milder and less frequent that she no longer has fear of them. Her bowel function is maintained quite regularly (passage time about forty-eight hours) by care with her diet, and her skin has markedly cleared. She is stronger and in better health than she had been previously for many years.

CASE II.—An unmarried woman, stenographer, *et.* thirty-three, had become undernourished, weak and much distressed by flatulence, dizziness, and marked nervousness about four years previous to examination. Before this time patient had been well at 117 lb., although always constipated. The latter has increased in severity with her failing strength, and she has developed a daily cathartic habit. She continues her work with difficulty. Examination made April, 1912, at a weight of 103 lb. shows general abdominal ptosis with reduplication of the transverse colon (pictures Nos. 1 and 2). Passage time over seventy-two hours. In Sep-

tember, 1912, weighing 117 lb., picture No. 3 shows distinct elevation and straightening of the transverse colon. At the present time (February, 1913), the patient weighs 117 lb., remains strong, has much more capacity for work, and is much less nervous, but is still troubled with flatulence, which probably has a mechanical basis, as the chemistry of digestion seems normal. This woman was in the hospital only two weeks, during which time her bowel was regulated, and an attempt was made to teach her the principles of her cure, which she has in a measure been able to carry on since leaving, with distinct benefit.

CASE III.—Married woman, *æt.* forty-one, I-para, had been practically well and strong at 140 lb., except for a moderately severe constipation, until four years ago. By reason of her increasing constipation she began to lose weight and strength at this time, and to suffer with abdominal distress. There was a moderate connective-tissue lenteria, although the emptying time of the stomach was eight hours. Examination in April, 1912, at a weight of 103 lb., shows a general ptosis with moderate stomach and cecum stagnation. Passage time of



Case V, No. 1.



Case V, No. 2.

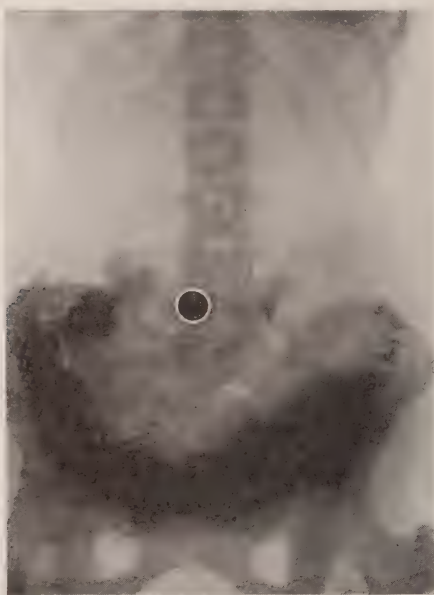
the remainder of the colon is normal. In August, 1912, weighing 137 lb., radiographs show a general elevation of the stomach and colon with normal passage time. The woman remains well at a weight of 143 lb. The pictures of the stomach before and after fattening (Nos. 1 and 2), only are reproduced. The colon plates show a corresponding result.

CASE IV.—Married woman, *æt.* thirty-four, III-para. For many years had suffered somewhat from bloating, noisy belching, general nervousness, and was easily fatigued. The pictures Nos. 1 and 2, which were taken at a weight of 102 lb. show a typical general abdominal ptosis with both the hepatic and splenic flexures dropped. The emptying time of the stomach is normal and entire passage time within thirty hours. The patient became free from her distress on adding 12 to 15 lb. to her weight. She has now maintained this result for fourteen months. End-result pictures were not taken. This is a good example of moderately increased motility on the part of the colon when its two fixed points of attachment have given way.

CASE V.—Married woman, *æt.* twenty-eight, II-para. Although patient had been slender in build all her life, she had enjoyed good health until she weaned her first child. She then quickly dropped to 92 lb. and suffered much from general weakness, was easily fatigued and had aching pains in the neck, shoulders, back and chest. There had always been a rather free bowel function. While nursing her second child she gained in weight to 115 lb. and felt well. After this she fell again to 97 lb. and had her former distress reappear. Pictures Nos. 1 and 2 were taken at a weight of 99 lb. They show a vertical type of stomach with dropped pylorus and general coloptosis as in Case IV. The entire passage time is well within thirty hours. In the summer of 1912 she was built up to a point where she felt very well and strong and held a weight of 120 lb. The reason for recording this case is to point out the necessity of holding the added weight for a sufficient length of time that the body may become habituated to it. After a period of three months, the patient's second child suddenly died. A week later she was compelled to go East on account of the serious illness of a



Case VI, No. 1.



Case VI, No. 2.

sister, so that in hardly more than two weeks' time she again weighed under 100 lb., and was suffering distress as before. Fortunately, she understands well the philosophy of her cure, and will ultimately succeed in her efforts.

CASE VI.—Married woman, *æt.* twenty-nine, I-para. Patient presents the picture of a severe general asthenia with a spastic type of constipation of mild degree. Pictures Nos. 1 and 2 show the extreme general ptosis with loss of hepatic and splenic flexures. Emptying time of the stomach is a little delayed and the total passage time is within forty-eight hours. The reason for recording this case is to emphasize the importance of the psychical factor which enters into the treatment of the general asthenic. The patient was in the hospital five weeks, during which time she was treated with the greatest diligence and care. But psychically she could not be reached; she responded in no way, and the result was entirely a failure. There was never any doubt as to the absence of all surgical phases in this case, and the writer does not be-

lieve but that suspensory operations would add to the woman's plight. Her mild constipation was quickly corrected; and, also, at no time was there any evidence of the effects of intestinal stasis.

CASE VII.—Married woman, *æt.* thirty-six, II-para. Patient is a woman of large frame, weighing 145 lb., but has for years suffered from obstinate constipation and reflex stomach distress, and a severe acne rosacea. The latter had been treated by several dermatologists of note without material benefit. Pictures Nos. 1 and 2 show general gastro-intestinal ptosis with moderate stagnation in the stomach (ten hours) and a slight stasis in the cecum. The passage of the bismuth is more rapid than normal in all portions of the colon, excepting the cecum, but the entire passage time is about sixty hours. This patient had not responded to anti-constipation diets, and as the chemistry of the digestion seemed normal, *x-ray* examinations were made which determined the foregoing findings. The addition of 10 to 15 lb. to her previous weight effectively cured her constipation and her skin lesions as well.



Case VII, No. 1.



Case VII, No. 2.

Surgical Cases.—Cases presenting surgical ptoses or conditions looked upon as surgical complications:—

CASE VIII.—Unmarried woman, *æt.* twenty-seven. Patient presents the usual picture of well-marked general asthenia. General neurasthenic symptoms are marked. Since 1904, there have been four attacks of moderate pain and soreness in the right groin accompanied by a little fever, which were looked upon as mild attacks of appendicitis. There was a tendency to irregular acute upsets and mild constipation. Pictures Nos. 1 and 2 show a general abdominal ptosis, but added to this a distinct stasis in the lower ileum. In spite of the local findings, the patient underwent a modified rest cure because of her general condition being considered too poor to withstand an operation. 40 lb. were added to her previous weight with a corresponding increase in her health, but at this time she suffered her fifth attack of local inflammation associated

with nausea, fever to 101° F., and localized tenderness. As soon as the attack subsided she was operated upon by Dr. Mackenzie, who found a distinct Lane kink to be the cause of the ileum stasis. During the convalescence the patient was fattened and has remained very well since (eight months).

CASE IX.—Young man, *æt.* twenty-eight, accountant. Patient's history has been one of obstinate constipation for many years. He has never known a time when the bowel function could have been called regular; although until six years ago he had been quite well and strong. His weight at this time was 196 lb. Without recognizing any cause excepting the severe constipation he began to lose weight. In May, 1911, when the writer first saw him he was weighing 129 lb.—a tall, gaunt, emaciated man, with yellow, pigmented skin—weak and of sluggish mentality: the typical picture of chronic stercoral stasis. Examination showed the presence of general abdominal ptosis, the true features of which were not recognized, as at that time the writer did not appreciate the value of *x-ray* diagnosis in these cases. All attempts to fatten the



Case VIII, No. 1.



Case VIII, No. 2.

patient and regulate his bowel proved futile, so that the writer referred him, in November, 1911, to Dr. Coffey, for surgical treatment. At operation the transverse colon was found piled up in the pelvis with the bursa of the great omentum remaining unfused. The stomach had remained in quite normal position. A suspensory operation on the colon, tacking the omentum to the abdominal wall, permitted the bowel to move fairly satisfactorily, and the patient made a good recovery. In September, 1912, he was weighing about 160 lb., his bowel had become quite regular, his skin clear, his mentality brighter, and in every way he seemed perfectly well.

CASE X.—Unmarried woman, *æt.* twenty-eight, house-maid. Patient has had for many years obstinate constipation. Eleven years ago she began having periods of severe pain in the lower abdomen, especially on the right side and behind the bladder. Five years ago the pain became more severe, associated with vomiting and alternating dysentery and colon cramps. In the meantime

the right kidney had been anchored and the appendix removed without relief. When examined in April, 1912, the kidney had again prolapsed to the fourth degree along with a probable mobile cecum. The writer referred her for surgical treatment at the time, with the idea of having the kidney and cecum replaced and then correcting the colitis medically later, as he had looked upon the latter in the main as a secondary gastrogenic disease with a marked connective-tissue lenterly. At operation a midline ptosis was also found and suspended. An infection of the kidney wound delayed convalescence, so that for several months she remained in the hospital, but with obstinate constipation and colon cramps. Later she was referred back to the writer because of the bowel trouble. This readily yielded to dietetic measures and she was quite rapidly fattened. When last seen (February, 1913) she was the picture of health and reported that her bowel had become entirely regulated. This case is recorded both because it presents a definite type of surgical ptosis (extreme mobile cecum) and a medical type of chronic colitis which was not corrected



Case XI, No. 1.



Case XI, No. 2.

by the operation. Whether the midline ptosis could have been overcome by fattening is, of course, unknown, but at any rate the suspension of the colon alone did not cure the constipation nor relieve the colon spasm.

CASE XI.—Unmarried woman, *æt.* twenty-five. Seven years ago the patient began having stomach distress, sourness, bloating, etc., and loss of weight. Constipation began four years ago after which her general distress and loss of weight became more marked (142 to 112 lb.). Within the last year periodical vomiting has occurred. On examination it was thought that a general abdominal ptosis existed without marked local stasis, and because of the patient's circumstances the expense of *x-ray* work influenced the writer to omit this part of the examination. The patient was very weak and emaciated, and, finally, after a futile attempt to gain at home was made, she was placed in the hospital for seven weeks. The bowel was quite easily regulated, but the most carefully conducted overfeeding and strapping of the abdomen could not pre-

vent the periodical vomiting attacks. A gain of 16 lb. was obtained in this time, but there was almost no relief of symptoms. Finally *x-ray* examinations were made, with the result that in addition to a midline coloptosis there was found a markedly mobile cecum which could not be overcome. Stasis in the cecum lasted over seventy-two hours. The distance between the greater curvature of the stomach and the transverse colon would indicate the existence of a non-obiterated omental bursa. Pictures Nos. 1, 2, 3 and 4 were taken at a weight of 128 lb. The condition is distinctly surgical, but as yet operation has not been done.

The following 7 cases are recorded because they are examples of midline ptosis with acute kinking at the junction of the first and second portions of the duodenum. Four of them (XIII, XIV, XV, and XVI) went to operation with the diagnosis of chronic, periodically bleeding



Case XI, No. 3.



Case XI, No. 4.

ulcer, and 2 (XII and XVIII) had previously undergone a Lenhartz ulcer cure.

CASE XII.—Married woman, *et.* thirty, nullipara. For seven years has suffered periodical attacks of severe epigastric burning pain beginning one-half to one hour after eating and lasting until relieved by eating again or vomiting. Each attack is accompanied by severe local tenderness in epigastrium to right of median line. The bowel has been obstinately constipated and the colon sore. In 1908 patient underwent an unjustified operation for appendicitis, without effect. In 1910 she underwent a rigid Lenhartz ulcer cure lasting one month. During this time she was without pain, but as soon as she returned home the pain came back as severe as ever. This taught her (without its being appreciated by any one else) that she could eat without distress so long as she was lying down. During the year 1911, the writer examined her repeatedly while she suffered attacks, and in the intervals between them, without ever finding

occult or visible blood, sarcinae or even stagnation. The twelve-hour-fasting stomach (*i. e.*, from 9 p. m. to 9 a. m., the patient lying down) never contained more than 2 oz. of thin fluid without food remains. The screen examinations made by Dr. Walker showed a midline ptosis of the stomach, dilated, and possessing great motor power. A bolus of bismuth was repeatedly observed to rise vertically upward through the patent pylorus and reach an obstruction about 2 in. above it, then, as the peristaltic wave relaxed, to fall back into the stomach (the patient herself had observed *magensteifung* while standing, but never while lying down). Picture No. 1 shows the position of the stomach, the normal pylorus and the duodenum rising high above it. All attempts to benefit the patient by fattening, strapping the abdomen, lavage and regulating the bowel have proved futile. She has declined operative treatment thus far and still suffers.

CASE XIII.—Unmarried woman, *æt.* thirty-three, house-maid. Patient gives history of periodical paleness and weakness with the passing of black stools as



Case XII, No. 1.

a girl. At the age of twenty-one, associated with pain and sourness, she vomited a large amount of blood from which she partially lost consciousness. From this time on there have been many periods of epigastric pain after eating, sourness and local tenderness, without vomiting. Five years ago while seasick she again vomited blood. In May, 1912, during an attack she passed black stools for four days, which Dr. Sommer found consisted largely of blood. Some days later there was no blood found in the fasting stomach or in the stools, and there was no stomach stasis. A local tender point to the left and above the umbilicus was very marked. The diagnosis of chronic bleeding ulcer of the pyloric area in a prolapsed stomach was made. Dr. Sommer found a midline gastropptosis with kinking at the junction of the first and second portions of the duodenum, but on opening the stomach and inspecting it from within there were no ulcers to be found. There were scattering small areas of recent submucous hemorrhage, and the veins in the pyloric region were varicosed. A suspensory operation was done and recovery is complete.

CASE XIV.—Man, *æt.* thirty-four, watchmaker. For over ten years patient has suffered two and three times a year from periods of sour distress, bloating, etc., two to three hours after eating. During the first attack he vomited once a large quantity of blood. In May, 1912, he again began vomiting, but saw no blood. He was always relieved quickly by lying down, and often he would leave his work to lie down for a few minutes to get this relief. During his free intervals he suffered no distress. Examination showed a prolapsed stomach without stagnation. The stools contained blood. A local point of tenderness was always found high in the epigastrium to the right of the median line. Dr. Coffey found at operation the same condition as noted in Case XIII, with this important addition: The veins about the pylorus were markedly varicosed, and along the course of one of the anterior ones, when the stomach was inspected from within, were found five small varicose ulcers, one of which had been bleeding. The ulcer-bearing area was removed and a suspensory operation was performed. Recovery is complete.



Case XVII, No. 1.



Case XVII, No. 2.

CASE XV.—Unmarried woman, *æt.* twenty-eight, nurse. For four years patient gives history of periodical epigastric pain after eating, passing through into the back and relieved by eating again. Three years ago she vomited blood. In July, 1912, she again vomited blood and lost from 145 to 115 lb., becoming at the same time very weak and anemic. The stools at this time were black from blood for several days. At the time of examination no stomach stasis existed, nor was blood found in the fasting stomach-contents or stools. In this case there was no point of local tenderness. The diagnosis of chronic ulcer was shown to be incorrect by Dr. Coffey on operation. The suspending of the stomach as in the preceding cases has resulted in complete cure.

CASE XVI.—Young woman, *æt.* eighteen, attending school. Since childhood patient has complained of periodical attacks of stomach distress, sourness and burning, with some vomiting. In January, 1912, was confined to bed for one month under an ulcer cure with a severe attack, during which time for two

days there were black stools. Since this time patient has been in poor health with a constant point of severe local tenderness just to the left and above the umbilicus. Blood was found in the fasting stomach once but not in the stools. Bleeding from the trauma of the tube could be ruled out. The diagnosis of chronic ulcer was made but shown to be incorrect by operation. Midline gastropptosis with kinking of the duodenum at the junction of its first and second portions was found. There were small areas of submucous hemorrhage and varicosed gastric veins. Suspension has resulted in cure.

CASE XVII.—Married woman, *æt.* forty-five, I-para, menopause at forty-two. Patient began having very severe, periodical, temple and vertex headaches at fourteen years of age. The attacks came from two to four times a month, preceded by intense burning and hurting in the stomach which led to sour vomiting that gave relief. Obstinate constipation with occasional periods of dysentery had existed since childhood. There was some form of jaundice during infancy and again at fourteen. She was thrown severely from a horse at sixteen, but this



Case XVIII.

did not seem to influence her health. Patient is a tall, gaunt, sallow-complexioned woman, weighing 125 lb. Her highest weight heretofore has been 137 lb., when she also felt some better and her migraine was less severe. Pictures Nos. 1 and 2, taken at the former weight, show a marked midline gastropptosis with kinking at the junction of the first and second portions of the duodenum and a prolapsed cecum of moderate degree. The emptying time of the stomach in the upright position is over ten hours, but it probably is fairly normal while lying down, for the fasting stomach over night (9 p. m. to 9 a. m.) never gave evidence of food remains. Local stasis exists in the cecum alone as regards the colon, and the total passage time is about sixty hours.

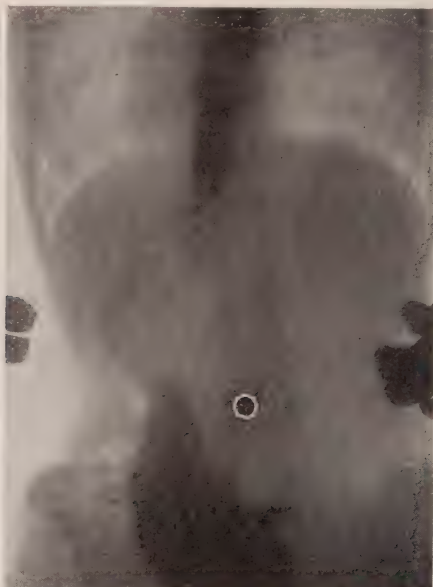
This case has been of special interest to the writer for the reason that he looked upon it as a surgical condition and doubted very much that any benefit would result from medical treatment. Operation was declined and the latter plan undertaken. By careful overfeeding, recumbent position after eating,

strapping the abdomen, and lavaging the stomach at the beginning of any sourness, the attacks of migraine were much lessened both in severity and frequency, and a gain in weight of about 30 lb. obtained. The bowel proved fairly easy to regulate, so that with the increasing health the sallowness of the skin largely disappeared. The patient is much better than she has been for years and seems quite satisfied with her condition, but the writer is of the opinion that it will be very easy for her to relapse, and that sooner or later she will seek permanent relief from surgical measures.

CASE XVIII.—Unmarried woman, *et.* twenty-seven, stenographer. Patient had been running down in weight and strength, supposedly from overwork, when in October, 1912, she began to have severe periodical epigastric pain and hurting after eating which radiated up into the right back and down into the left flank. Severe constipation began at the same time and there was a feeling of nausea, weight and pressure in addition to the pain. Extreme local tenderness existed above the umbilicus and just to the left of the median line. The chemistry of



Case XIX, No. 1.



Case XIX, No. 2.

the stomach was normal, but blood was repeatedly found both in the stomach-contents and the stools. Because of the acute onset and the frequent finding of blood the case was looked upon as a recent ulcer in a prolapsed stomach. X-ray diagnosis was not resorted to here as in Case XI because of the patient's circumstances. A Lenhart ulcer cure was carried out in hospital, with the result that relief from symptoms and local tenderness was obtained quickly and the blood left the stools. One week after returning home the same pain came back, together with the local tenderness, vomiting and dysentery. Picture No. 1 reproduced here shows the dilated stomach to be in the midline ptotic position with the duodenum kinked (seen by the screen) about 2 in. above the pylorus. The psychically upset state of the patient would, the writer thinks, preclude any definite results from attempted fattening, and surgery will be resorted to, as it would have been in the beginning had the true condition been recognized at the time.

Midline ptosis of the stomach leading to obstructive symptoms is a condition more frequently present than recognized. It is probable that many of the cases of supposed chronic ulcer operated upon, in which there are no evidences of ulcer found, belong to this group. The symptoms of ulcer may be reproduced perfectly. Without suitable *x*-ray examinations a differential diagnosis may be out of the question. In the writer's 7 cases, 6 of them have been considered ulcer; 2 had undergone ulcer cures in the hospital; 5 had periodically bled; 5 possessed definite localized areas of tenderness. In the 4 cases operated upon all had varicose veins radiating out from the pylorus and from the cardia; 1 had five small, but distinct, varicose ulcers along the line of an anterior vein; 2 had areas of submucous hemorrhage which no doubt had led to hemorrhagic erosions; 1 showed no lesion of the mucosa; and all were cured by suspension operations alone. There seem to be, however, certain points of distinction which should cause one at least to suspicion the presence of kinking of the duodenum due to prolapse, and direct him to have suitable *x*-ray examinations made. They are: Relief from distress on lying down (ulcer of the anterior wall may act similarly); presence of stagnation while the patient is in the upright position, and its absence after lying down; presence of normal stomach chemistry and absence of sarcinae (this occurred in all 7 cases, although the writer sees no reason why variations in the chemistry should not exist). The findings by proper screen examinations, on the other hand, are quite distinctive. The stomach is prolapsed and dilated; the high point of the duodenum is 2 or 3 in. vertically, or nearly vertically, above the pylorus, which is widely patent; the bolus of bismuth is seen to rise vertically upward to this high point through the wide open pylorus and then fall back into the stomach, with only a small portion or none at all passing the obstruction; the local point of tenderness seems to be a referred point, lying either to the right or left of the median line and not of necessity directly over the point of obstruction. The signs of ulcer, *i. e.*, niches, deformed caps, localized blocking of peristaltic waves, localization of tenderness over ulcer and, as in duodenal ulcer, hypermotility, are all absent.

CASE XIX.—Unmarried woman, *æ*t. twenty-three. Patient has been delicate and severely constipated since early childhood. At seventeen she felt fairly well for a short time at a weight of 120 lb., but was still constipated. Soon after this she began having cutting pains beneath the lower sternum immediately after eating, which were relieved by vomiting. Usually the vomiting was a regurgitation of food just eaten, but occasionally it was sour. Often the food seemed to stick at a point beneath the sternum, remain there for a time and then gurgle through into, as she thought, the stomach below. Periodically the difficult swallowing ceased for a time, but would reappear, especially when she was severely constipated. She now weighs 90 lb. On examination of the twelve-hour-fasting stomach (over night) 3 oz. of food remains and mucus, which carried no ferments, were removed from the esophagus. By having the patient relax by deep breathing, the tube passed into the stomach and was found to be empty. An esophageal bougie armed with a medium-sized olive passed through with the

same amount of obstruction. After an Ewald breakfast 3 oz. of water and bread were removed from the esophagus which contained no ferments. Subsequently the contents of the stomach were obtained and found to have an acidity of 20-35 and rennet positive in dilution of 1-80. On the following day it was found impossible to pass a tube or bougie without undue force. Pictures Nos. 1 and 2 show that interesting type of ptosis which resembles cardiospasm, and which was first recognized by Rovsing, as previously stated. The esophagus is dilated, filled with bismuth, and the screen examinations show an absence of deforming ulcer. The condition is obviously surgical. Rovsing states that his patients have been cured by gastropexy.

At time of proof reading (May 17th, 1913) patient has recovered well from a suspension operation, done by Dr. Coffey; has gained over 30 lb. in weight, and, although the esophagus still remains somewhat atonic, and swallowing a little difficult, her recovery will probably be complete.

BIBLIOGRAPHY.

- 1 Wolkow and Delitzin: *Die Wandermiere*, etc. Berlin, 1899.
- 2 Coffey (*Surgery, Gynec. and Obstet.*, Vol. 15, No. 4, October, 1912).
- 3 Dwight, Symington, Testul and Jacob: Quoted by Goldthwait (*Boston Med. and Surg. Journ.*, Vol. CLXII, No. 21).
- 4 Albu (*Berl. klin. Wochenschr.*, No. 7, 1909).
- 5 Rovsing (*Journ. Amer. Med. Assoc.*, Vol. LIX, No. 5, August 3rd, 1912).
- 6 Mackenzie (*Journ. Amer. Med. Assoc.*, Vol. LIX, No. 5, August 3rd, 1912).
- 7 Goldthwait (*Boston Med. and Surg. Journ.*, Vol. CLXII, No. 21, May 26th, 1910).
- 8 Olbert (*Zeitschr. fuer klin. Med.*, Bd. 71, Hft. 1 and 2).
- 9 Rovsing (*Hospitalstidende*, Copenhagen, January 1st, Vol. LVI, No. 1. Abs. *Journ. Amer. Med. Assoc.*, February 15th, 1913).

MEDICAL SCHOOL INSPECTION.

By FRANK ALLPORT, M. D., of Chicago.

SECTION I.

The subject of Medical School Inspection covers a very wide range of thought and action and is a topic so big and comprehensive that its discussion in a single paper can only be suggestive; but the writer hopes that this and other papers on this subject, which must inevitably appear from time to time, will soon induce the authorities of all municipalities in this country to give their children a 'square deal,' and that the schools of all cities will be administered along such high and proper planes that the intelligent citizens of the various commonwealths will be able to find no occasion for apology or mortification.

The writer does not wish to be misunderstood as insinuating that the schools of any particular city are conspicuously poor, and are administered in a manner meriting special reproof. Some cities have advanced further along these lines than others; but, as a rule, he believes that the schools of the various cities are quite similar, as to efficiency and progress, along the lines of hygiene and health. All cities have some excellent school buildings, but they also have some buildings called 'schools' by courtesy, where no child should be expected to attend, and within whose walls disease and physical defects are born and cultivated. We all become accustomed to evils, and a school building which the writer, as a stranger, would instantly condemn as totally unfit for use, you, perhaps, who have grown accustomed to its old familiar walls, would regard as a very good school-house after all, and much better than the one you at one time attended and from which you finally emerged in most excellent physical condition. But these views do not make bad school-houses good school-houses; they simply show what good strong bodies can endure, and prove the old rule of 'the survival of the fittest.' Many practical individuals do not see the advantage, nay the *necessity*, for medical school inspection, for school-nurses, for schools for defectives, for gymnasiums, and for many other school invasions which have assuredly come to stay, and which are not merely 'new-fangled' notions, but which have become an important part of the world's progress and which should be encountered and assisted by all right-minded and progressive individuals. In this connection it is interesting to read from the inaugural address of Governor Ferris, of Michigan, the following sentiments concerning the subject of school-houses. He says: "For more than a quarter of a century I have made a careful study of the school-houses of Michigan. The

majority of them are insanitary and unfit for live-stock to occupy. They rarely furnish adequate light, never furnish a proper supply of pure air, are not comfortably heated, and, on the whole, are destructive to the health of school-children. It should be remembered that the ordinary school-room, unlike the ordinary dwelling-room, is frequently occupied by a large number of children. Probably no one reform would exert a greater influence in reducing the death-rate of children than would the construction of sanitary school-houses. Ordinarily, school-officers know very little about modern sanitation. It is largely a question of how large a 'pen' is required to protect the boys and girls from inclement weather. A law should be enacted whereby all plans for school-houses should be submitted to the superintendent of public instruction and the secretary of the State Board of Health. These officials would approve of the heating, ventilating and lighting, in fact, of all the sanitary essentials, before the contracts could be entered into for construction. In states where this plan has been pursued, satisfactory results have been realized." There can be no doubt of the necessity for state laws controlling the building of school-houses. This need has been sadly neglected in this country, as Ohio and Minnesota are the only states having a law of this nature. Some of the other states have inadequate laws controlling this important matter, while nineteen states have no laws on this subject whatever.

In the first portion of his paper, the writer said that what he had to say would cover a wide range of thought and action. He wishes to emphasize the word 'action.' Action without thought is foolish and perhaps disastrous, and thought without action is puerile. The man who simply sits and thinks, and thinks and sits, will never accomplish anything. His thoughts may be of the highest order, but unless he puts them into action, how does he benefit the world, or, for that matter, how does he benefit himself; he is merely a Utopian dreamer. Therefore, of what use is it for the writer, or for anybody else to advocate the administration of schools along the highest hygienic and sanitary lines, unless prompt and intelligent action is taken? How does it benefit individuals and municipalities to become familiar with the best methods of building and equipping schools, unless they are going to build them under the supervision of architects who are acknowledged to be masters in this particular avenue of work, and to equip them along those modern lines which are now pretty well understood by the best school architects and educators? Of what use will it be to appoint medical school inspectors, to inspect the health of the children unless they are to be clothed with authority, unless they do their work faithfully and well, and unless inspection and the discovery of disease and defects is followed by the treatment and care of such diseases and defects; of what use is it for school superintendents, or medical school inspectors, or writers to point out that a certain venerable pile of bricks and mortar, sometimes by courtesy called a 'school-house,' is in reality a pest-house, full of infection and bad

air, and draughts and dirt, and bad plumbing and improper lighting, and generally deficient equipment, through whose doors no child should be asked, and much less *compelled* to pass (as is the case in thirty-six out of our forty-eight states) unless this ancient breeder of disease and defects is going to be demolished and a new and properly built and equipped school-building erected in its place where the children may learn happiness, and where those who are well may keep well, and where those who are sick may become strong, and where those who are immoral may become moral, and where those who are dirty and foul may learn the blessing of cleanliness, and where those who are lazy may learn industry, and that the really desirable prizes of life are distributed to those who have actually earned them. The writer wishes emphatically to endorse the recommendation of many school-boards, and lately of Mayor Harrison, of Chicago, that our public schools should be made social centres for the people of the neighborhood, where they may hold social gatherings and all kinds of proper entertainments and meetings. This step would lead the people to regard the schools as neighborhood property and as a place where they and their children may go and be happy.

The sanitary and hygienic condition of many school-houses in this country really beggars description, and so foul and unhealthy in some of their portions are these school-houses, and so liable to carry unspeakable diseases, that the subject is almost, if not quite, impossible to discuss before a mixed audience.

The child is the greatest asset of the state. Children are placed in our hands to shape and mould as seems best to us: the boy in whose hands may be placed the political or financial welfare of the nation, and the girl whose natural, social and even public duties will exercise such an important influence in directing the destinies of the country. Are the public schools doing too much or too little in their efforts properly to train these yielding and budding fruits of the nation? Some ultra-practical people feel that *they* had no such attention paid to them when they were young and that *they* got on all right. They think that medical inspection and a lot of other fads are worked to death, and that pupils and parents should learn to become self-reliant and strong, and not yielding and weak by the consciousness that the school and a parental government are constantly looking after their welfare, and solving all or most of their problems for them. It is safe to say that people who entertain such views, either possess minds utterly inadequate to cope with the situation, or have never given the subject sufficient thought and consideration. The truth of the matter is, that even though enormous progress has been made along the lines of the conservation of children, we are yet a long way from performing our duty by them. We invite, nay we require, that children shall attend the schools; we arrest them for truancy and vagrancy if they do not; shall we then insist upon their spending most of their waking hours in a disease-laden atmosphere, improperly lighted,

heated and plumbed, where abnormal and diseased conditions are encouraged, and where school-life can easily become a curse rather than a blessing; or shall we invite them to buildings that are perfectly adapted to school-life, where the lighting, ventilating and plumbing and heating are of the most modern description, where cleanliness prevails, where physical abnormalities are detected and relieved and where medical inspection is constant, and epidemics are eliminated, and where children are educated according to their mental capacity? The writer thinks that there can be no doubt as to which of these pictures is the most attractive and honorable, and he is sure that there is no doubt in the mind of any father or mother, under which system he or she will elect to have his or her child educated. Nor does our obligation stop with our duty to the individual child. We are educating and rearing a nation. It rests with us to say whether the next generation shall become better and stronger than the preceding one; whether the race shall advance or retreat. These changes are very largely brought about through the agency of the public schools. Here the children come together and mingle, here they spend their waking hours; it is the great melting-pot where the different people of the earth become amalgamated and begin to understand the nature of United States citizenship. Many of these children come from homes of squalor, destitution and crime; the school is their real home and the teacher their real mother. All that is good and decent and clean and wholesome and elevating comes to them through their school; when they return home at night they resume their contemplation of, and contact with, those elements which tend to pull them down, and drag them into sickness, indolence and crime. If, therefore, we wish to produce and perpetuate a nation of strong, virile, intellectual and normal men and women, and if each succeeding generation shall entertain the same laudable ambition, let us see to it that our public schools are in every way of the best possible character, and that they shall be improved from year to year to keep pace with modern methods and advanced science, for surely nothing is too good for the coming masters and mistresses of the nation.

To education then, to public schools and their environments we must inevitably largely look for the improvement and elevation of the nation. Nor does obligation to the public schools end here, for it has been estimated that 70 per cent. of the deaths in the United States are due to contagion and epidemic diseases and that a vast majority of these diseases originate in schools. If, therefore, careful and constant medical inspection of schools can largely suppress the spread of such diseases, it can easily be seen what the beneficial effect of such inspection will have upon the mortality and health records of the country. Our children must be educated, and educated in schools. It is, therefore, our duty to do our utmost to prevent the inception and propagation of contagious and infectious diseases, which so easily get beyond control under insufficient

and inadequate medical inspection. Furthermore, it must not be forgotten that death is not the only thing to be dreaded that follows in the wake of such diseases; for discharging and deafened ears, enlarged tonsils and adenoids, various forms of eye and ear diseases, the paralysis, and many other diseases date their inception from the contagious and infectious diseases of childhood. The medical inspection of schools can, and will, enormously minimize the occurrence and spread of such diseases, and should therefore be universal, as it will materially assist in the building up of a numerous and strong people, and in the elimination of death, disease and misery.

SECTION II.

The magnitude and importance of the school hygiene proposition may, perhaps, be emphasized by the recitation of a few figures, which the writer will quote hurriedly, leaving it to be judged whether such an enormous enterprise should be administered in a business-like manner or not.

There are about 20,000,000 school-children in the United States. They constitute 20 per cent. of the entire population. Of these 20,000,000 children, it is estimated that at least 75 per cent. of them are suffering from some partially, or completely remediable defect which is more or less interfering with their physical, mental and normal advancement. It is estimated that 500,000 school-children in this country have some form of organic heart disease, 1,000,000 have tuberculosis, 1,000,000 have spinal curvature, etc., 1,000,000 have defective hearing, 5,000,000 have defective vision, 5,000,000 have malnutrition, 6,000,000 have operable adenoids and tonsils, 10,000,000 have defective teeth; and so the estimations might continue. There are 260,000 schools in this country valued at \$850,000,000, and costing about \$500,000,000 a year to maintain. Quoting the language of the Russell Sage Foundation: "Our expenditures for public education have more than doubled in the past ten years. No other investment produces so large a return. More money means better schools. Better schools means better citizens. Better citizens means more money. It is a benefit circle." More than one school-house burns down for every school day in the year. We have 475,000 teachers, 70 per cent. of whom are women, and 22 per cent. of whom are men. They are practically all underpaid, considering the high character of work demanded, receiving only on an average \$40.00 per month, or less than the average day laborer. In some states teachers earn less than \$150.00 a year.

Some of the statistics concerning our public schools are both interesting and instructive. They show in a general way that the children of Massachusetts and New York have the best opportunities for securing an education, while the children of Mississippi, Louisiana, and some other Southern states have the worst. Showing the two extremes, the school property of Massachusetts costs \$115.00 per child, while the schools of Mississippi only cost \$4.00 per child. The annual expenditure per

child for school maintenance is \$32.00 in Washington, while in South Carolina it is only \$3.00. Concerning the average school attendance per child, it is 131 days in Massachusetts, and 46 days in New Mexico. It seems that as a nation, "the United States has a shorter school day, a shorter school week, and a shorter school year than any other highly civilized country in the world." Schools are kept open 193 days in a year in Rhode Island and 100 days in New Mexico. The average attendance per child is 121 days in Oregon and 74 days in Mississippi. Texas, Mississippi, Alabama, Georgia, Florida and South Carolina have no compulsory school laws. Arkansas, Louisiana, Tennessee, North Carolina, Virginia and Maryland have partially compulsory laws, while all the other states require school attendance. It costs 39c a day to educate a child in Nevada, while in South Carolina it only costs 7c. The lower the cost, the poorer the teaching. They pay the highest average salaries to teachers in California (\$918.00) and the lowest in North Carolina (\$200.00). In 1910 there were in the United States, 5,517,608 people over ten years of age, who could neither read nor write. In other words, 77 in every 1,000 persons over ten years of age were illiterate. This illiteracy obtained more in the Southern states, and in those states receiving large volumes of ignorant foreign immigration. Iowa possessed less illiterates than any other state and Louisiana more. About 50,000 American children are annually removed from school on account of physical defects.

In a recent article by Dr. E. A. Ayers, of New Jersey, he found that \$44,000,000 were invested in the public schools of New Jersey alone. It costs \$13,000,000 a year to run the schools, and there were 500,000 pupils. The possible attendance of these pupils estimated by days was 71,000,000 and yet the number of days of actual absence from school was 9,000,000. As Dr. Ayers expresses it: "Here was a plant with a total investment (including absorbed interest) of some \$60,000,000 using about 12 per cent. of its utility through absence of pupils, which is equal to about \$5,000,000 of capital, standing idle." Dr. Ayers estimates that 75 per cent. of this absence was due to sickness, which caused a loss of 7,000,000 days, or \$3,750,000 in money. If proper medical inspection and treatment can materially save this enormous leakage, it surely is worth while. In searching for a remedy for these and other ills, connected with the health and learning capacity of children, Dr. Ayers points to the utterly confused and discouraging conditions existing in the different cities and states of this country. Some states have certain laws, while other states have others. Some cities perform medical inspection in one way, while other cities use entirely different methods, and many cities have no medical inspection at all. What is needed is the universal adoption of some method of work, which will bring order out of chaos, and which will provide some intelligent and uniform procedure that will insure the children of this land a fair start in the battle of life. Dr. Ayers hopes to start this movement in his own state by creating the office of State Supervisor of

Medical Inspection of Schools, and a bill to this effect is now before the State Legislature. The annual cost of this office, together with office assistant, will probably not exceed \$12,000.00. It will be this officer's duty to do all in his power to create and enforce uniform laws and rules calculated to foster the health and physical well-being of the school-children of the state, and to instruct and encourage all those who are assisting him in this work in the various towns and cities of the state. If the general plan and spirit of this great work could be carried out, not only in New Jersey, but in the other states of this country, a wonderful revolution would be brought about, and the writer heartily and earnestly recommends that prompt action be taken along these lines in each and every state in this Union. It would be a great movement for economy, for health, for happiness, for intelligence, for national strength and for the reduction of crime, and should be brought into action at the earliest possible moment.

The German Government reports that about 50 children commit suicide annually, on account of discouragement with their progress in schools. It is possible that the enormous amount of work imposed upon German school-children may have something to do with this juvenile suicidal tendency amongst the Teutonic scholars across the water. Children are overcrowded with studies in German schools, and are usually compelled, not only to study all day in their schools, but also to study much of the evening in their homes, in order to keep up with their classes, to say nothing of the abominable German print. The writer believes that curriculums should never be so extensive as to require any appreciable amount of home study. Children need this time for rest and recreation.

It is reported that about \$2,000,000 annually is saved to the school fund in Pennsylvania by the medical inspection of schools.

There are about 300,000 blind people in the United States, costing about \$15,000,000 to support, and most of this blindness could have been eliminated by proper medical supervision and treatment. 75 per cent. of American children, or 15,000,000 have some eye, ear, nose or throat defect, which is seriously interfering with their educational progress. Most of these children can be relieved by proper inspection and treatment. London authorities claim that it costs £23 per annum to educate a deaf child, whereas a normal child can be educated for £14 per annum.

It was found in New York that in a school population of 650,000, 30 per cent. of the children were about two years behind their grades, and that 90 per cent. of them were delinquent because of eye, ear, nose or throat defects. Dr. Cronin found in one New York school 150 marked defectives who were very backward in their studies, and incorrigible in their character. Of these, 137 had enlarged tonsils and adenoids, and 13 had defective vision. These conditions were removed and in six months 75 per cent. of them were reexamined. They were all doing well in their studies and were becoming advanced in their grades. Their characters

had undergone a remarkable change for the better. It has been estimated that 40,000 children (annually) in Minnesota have adenoids that retard them one year in their studies. One year's schooling in Minnesota costs \$25.00 per child. Therefore it costs Minnesota \$1,000,000 extra per annum to educate these retarded children, who might all be easily cured by a simple operation. The question is, Does this pay? Would it not be much cheaper to eliminate adenoids from the state, which could be done for a very small cost per annum? It has been found that diseased or defective children are handicapped at least 10 per cent. in the acquirement of an education.

Ninety per cent. of school-children suffer from decayed teeth and deformed mouths, the next most frequent defect being impaired throats and vision. Decayed teeth mean aching teeth; aching teeth mean germ-ridden mouths and germ-saturated food favoring the propagation of contagious diseases, poor mastication and digestion, impaired nourishment and bodily resistance, intestinal and general toxic absorption, all of which prevent proper intellectual advancement, and favor the various forms of physical disturbance and degeneration. As great a man as Dr. Osler said in the *Lancet*: "If I were asked to say whether more physical deterioration was produced by alcohol, or by defective teeth, I should unhesitatingly say, 'defective teeth.'" It has been abundantly proved in Germany that where children's teeth are in good condition "they become physically stronger, secure a higher average in their studies, and are easier to control and apparently happier."

In Vienna they have even gone to the extreme of forming a separate society for the purpose of advancing the care of school-children's teeth. The authorities have taken hold of the matter and will see that children are examined two or three times a year and that parents are urged to take defective children to competent dentists; poor children will be cared for in the clinic. Lectures on the care of the mouth are delivered twice a year to the children, and small prizes are distributed to those children having the best teeth. Besides this it is gratifying to be able to state that the "Austrian Society for the Care of the Teeth," has been organized recently, and is erecting buildings for dental work in various portions of Vienna. The first one is in Western Vienna, and four more are to be speedily erected. The buildings are not large, but modern and convenient. They contain a waiting-room, a surgery, a room for extracting teeth and a resting-room for use after operation. A building has recently been erected in Boston at a cost of \$1,500,000 in memory of the Forsyth brothers, which will be utilized exclusively for the purpose of caring for the teeth of poor children. The writer thinks there can be no doubt but that dentists who work in dental dispensaries should receive a reasonable compensation, which should be paid, as a rule, by the institution. Dentistry is hard, arduous and confining work, and if good work is to be done for poor people, the dentist should certainly receive some reasonable

compensation. At all events, it has been shown in many instances that where graduated dentists receive no compensation for this kind of work, their interest soon lags, the efficiency of the service diminishes, and constant changes occur in the attending staff, producing, of course, a constant and growing detriment to the work.

Twenty thousand tooth brushes and forty gross of tooth powder were distributed recently in Philadelphia free to public school-children by Dr. P. B. McCullough and his assistants in the City Hall at the free dental clinic. Dentists of the city in practice more than twenty years raised the fund for this purpose. These were given each child when his mouth had been put in proper condition at the clinic. At one school, where examinations of the mouths of 110 children were made, only six sets of perfect teeth were found. Children should be instructed concerning the care of their teeth and mouths, and especially concerning the use of tooth brushes, tooth powder, the use of tooth picks and silk floss between the teeth, and frequent visits to dentists. In some cities, as for instance Denver, little leaflets are distributed, under the auspices of the State Superintendent of Public Instruction, to teachers, parents and scholars, telling them the value of the teeth, their important function in the preservation of health, and how they can best be cared for and retained in a healthy condition. The writer may say, in passing, that the same department in Colorado distributes freely leaflets concerning the eyes, ears, throat and other portions of the body. One of the large packing houses of Chicago, realizing that good teeth are an important factor in the maintenance of physical equilibrium, and that bad teeth induce poor health, pain, absence from business, the use of liquor, etc., has lately established at the yards a dental infirmary, where their employees may be cared for practically at no expense. The company pays the bills and considers they are saving money by so doing.

It would be quite possible to continue the quotation of figures almost indefinitely upon these interesting subjects, but the writer thinks enough has been said to impress their importance, and he will therefore pass on to other phases of the topic under consideration. Before doing so, however, he wishes to protest against the proportionate amount of money spent on the building, equipment and maintenance of high-school buildings, as compared with the money spent on the schools of lower grades. Should any of you go to a strange city for the purpose of investigating its schools, you will find that your guide will point with pride to its high-school buildings, but will usually be compelled to blush with shame at many of the others. In Illinois, for instance, it has recently been shown that one-fourth of the money raised for school purposes is spent in maintaining the high-schools of the municipalities. If the writer could have his way he would absolutely reverse such conditions, and would give the best there was to the younger children and the poorest to the older. It is when children are young that they need the best schools, the best air,

the best hygiene, the best personal attention, the best moral surroundings, the best equipment, etc. It is in early life that health and habits are established. The writer wishes, therefore, to emphasize his opinion that we should give of our very best to the very young; not that he wishes to debar the older children from the superlative things of school life, for he wishes most heartily that they might all participate in the best; but, if there must be a choice as to who shall be the beneficiary of superior educational, hygienic and moral opportunities, by all means let them be awarded to the younger children.

SECTION III.

The first thing that naturally claims our attention is the school building itself and its internal and external equipment—a subject so vast that only its most salient features can be referred to at the present time. As has already been said, only architects should be employed who have made a special study of buildings of this character; there is no economy in trusting to others.

School buildings should be built in quiet, suitable and healthy locations, away from narrow streets and high buildings. They should have ample surroundings, vacant grounds to insure air, light and playgrounds, for “the citizenship of the future depends largely upon the playgrounds of to-day” and “education that takes no account of the health of the children is like a house built upon the sand.” Cheerful and healthy cellars should be provided for play upon stormy days, and roof gardens are advisable for pleasant days. Roof gardens (with high, safe walls) on school buildings and tenement houses are not utilized nearly as much as they should be. They not only provide safe, out-of-door places for exercise and amusements, but they serve the additional purpose of removing children from the unhealthy, evil and contaminating influences of the streets, especially in large cities.

School-rooms should be suitably and thoroughly lighted both by natural and artificial illumination, and should, as far as possible, strike the desk of the scholar from his back and left side. The question of sufficient light in school buildings is of vital importance. To obtain this, other buildings should be at a distance equal to twice their height from the school building. The illumination of a school-room should be of a quality and quantity that will amply light every portion of the room on a dark day. To secure this, the window surface should not be less than one-fifth or one-sixth of the floor surface, and the direction from which the illumination comes is a matter that is not particularly essential, although a north light is the steadiest and most constant; but many observers and teachers dislike it on account of the lack of sunlight—properly claiming that this absence is detrimental to the health and spirits of pupils. Sunlight is a destroyer of disease, and an inspiration and help to everybody, and it is certain that every school-room should be bathed in sunlight, at

least one hour each day. Scholars compelled to study by poor illumination will be found to carry the printed page close to the eye, in order to increase the quantity of retinal illumination, or to take advantage of the law that the illumination diminishes according to the square of the distance. This forces the accommodation and convergence of the optic axes, and causes undue congestion of the eyeball and surrounding tissues, which increases intraocular pressure and softens the coats of the eye, thus permitting elongation of the optic axis and the production of myopia. Windows should be at the side of the room and preferably to the left and back of the scholars. The lower portion of the windows should be about 3 ft. from the floor and extend to the ceiling, in order to obtain as much window space as possible. The margins of the window ledges should be beveled, both inside and out, to avoid shadows, and should not be placed on both sides of the room, as this would result in a confusing and injurious cross-light. There should be as little wall space on the sides where the windows are placed as possible, and the windows should be hinged at the top, in order to obtain proper ventilation without direct draughts. The Luxfer prism and factory-ribbed glass, by their increased power of collecting and diffusing light, is proving of great advantage in school buildings, especially in those locations in cities with smoky atmospheres, and in unfavorable locations. It may surprise and interest you to know that there are many country school-houses in this country where there are absolutely no windows in the building at all, every particle of light and ventilation proceeding from the one door. This seems incredible, but it is true nevertheless. Think of the effect such a school-house must have upon the physical and ocular condition of the children and teacher.

Blackboards should not be placed between windows, as it taxes the eyes exceedingly to endeavor to decipher marks upon a blackboard thus situated. The ceilings of a school-room should be high, in order to secure good light and ventilation. Artificial illumination should be of a good quality and sufficient in quantity. A profusion of incandescent lights with glazed globes, grouped at frequent intervals, concealed or visible, is the best illumination that can be secured, as it is white in character, intense in quality, and does not eat or vitiate the atmosphere. The Holophane globe surrounding an electric light is almost an ideal method of illumination. In order to carry out the idea of a light school-room, the walls should be painted in delicate shades of yellow, green, blue, or light gray. The blackboard can be covered, when not in use, by light-colored shades of a similar color to that of the walls. The woodwork, desks, etc. should be all of light-colored wood, in order to preserve as much illumination as possible. Window shades should be light in color and should roll from both the top and the bottom, with the possibility of their being long enough to roll up or down the full extent of the window surface.

The seats and desks are an item of great importance, and were first publically mentioned by Henry Barnard in 1860. He pointed out the

necessity of placing the seats close to the desks in order to avoid leaning forward. Seats and desks should be arranged in such a manner that the soles of the feet will rest squarely upon the floor, so that the erect position is the most natural and the easiest for the scholar to assume. In order to obtain this, the seats should be as wide as the thigh is long, measured from the inner bend of the knee to the back. They should be level and slightly concave, to prevent slipping forward. The front edge of the seat should be placed from 1 to 2½ in. underneath the inner edge of the desk. The top of the desk should incline toward the pupil at an angle of about ten degrees, and must be low enough to allow the forearm of the pupil to rest lightly upon it without raising the shoulders when in the act of writing, but sufficiently high to avoid the necessity for stooping in order to reach it. The lower part of the back and pelvis should be supported by a rest easily felt while sitting upright. It seems almost unnecessary to state that desks should be of different sizes to suit the pupils, and yet the writer has looked into school-rooms where but little attention was paid to this point. Some of the manufacturers construct desks in such a manner that by the adjustment of screws, etc., every desk in the room can be made of a proper size to any child who is likely to be in that particular school-room. By using desks of this kind, the fitting of the scholars to their desks will be an important procedure at the commencement of each school year. Of course, proper desks or seats will not solve the problem, some children will have weak backs, or will be otherwise bodily affected, and seem truly unable to sit in a school-room without half reclining upon a desk; and it is questionable whether children of this kind should be required to attend school sessions steadily. Other children are lazy and slouchy in their habits, and this will call for frequent admonishment on the part of their teacher.

Blackboards should be kept clean and have unglazed surfaces, and the figures, lines, etc., that are marked upon them should be of a size and character that can be easily seen without straining the eyes of the pupils. Some authorities have recommended the use of white boards with black chalk, instead of blackboards with white chalk, as black figures on a white surface can unquestionably be seen easier and farther than white figures on a black surface. The writer thinks a majority of practical educators, however, believe that the white boards with black chalk are extremely objectionable on account of the constant and distasteful soiling of the hands. If the blackboards are kept clean, the white crayon marks will be found to be sufficiently legible for all practical purposes. Many educators feel that blackboards should be of slate, and either green or black in color. They can easily be washed, and less crayon dust is spread through the room than if the ordinary painted blackboard is used.

Slates are justly becoming unpopular in schools, whether they are black or white, on account of the foul and unhealthy condition in which they become. If slates are used, however, the white slates are to be preferred,

as the black marks upon the white surface are much less trying to the eye than the faint gray marks of the pencil upon the old-fashioned slates. The best material with which to perform this kind of work is white unglazed paper and black ink, with a stub pen capable of making heavy strokes.

Maps and charts are important articles of school furniture and easy to teach with, if the marks upon them are large and legible. The ground-work upon which such maps are printed should be of white or yellow color, as characters printed upon dark shades, such as red or blue, are not easily distinguished. The study of geography as taught by hand atlases with varied colors, lines, figures, printing, etc., is very trying and is probably more injurious to the eye than any other study. Great care should therefore be taken in the printing of geographical textbooks and maps, and such books, as will be the least injurious to the visual organs of the child, should be chosen by school authorities.

The manufacture of the textbooks for schools is a subject of great importance. Books should be of a size that can be easily handled, and the paper used in the construction should be of good quality, non-translucent, reasonably thick and of white or cream color. The printing should be first class in every particular. The letters should be black, clear and of sufficient size for easy reading. The lines should have good distance between them. Long lines should be avoided, as extra accommodation is required to follow them, and if a page must be wide, it is better to divide its contents into columns.

Each scholar should have 15 sq. ft. of floor space and 200 c. ft. of air space. Each room should be about 30 ft. long, 25 ft. wide and 13 ft. high, and accommodate not more than 50 pupils. School buildings should not be too high, and should be as fireproof as possible, and should have ample fire escapes and fire extinguishers. Fire drills should be held frequently.

The entrance halls and stairways should be wide, and all scholars should be able to get out of the building in three minutes. There should be at least two stairways in every building. Balustrades should be high to prevent accidents, and rails should be provided of varying heights for different-sized scholars. The stairs should be well-lighted and should be built for children and not for adults. Floors should be well and solidly built, with the cracks filled in, and the angle connecting the floor to the wall concave instead of angular so as to prevent dirt accumulation and to facilitate cleaning. Each class-room should have a large, well-lighted and well-ventilated cloak-room. Plenty of hooks and shelf room should be provided.

Schools should be heated by steam or hot water and should be provided with the best and most modern methods of ventilation, which should furnish each child with 30 ft. of fresh air every minute. At each recess the windows in each school-room should be widely opened and the rooms thoroughly aired.

The temperature of the school-room should be kept at about 68° F., and the air should be moist from water-ports or some similar device. It has been abundantly proved that children can do much better work in cool rooms than in warm rooms, and a temperature of 68° F. has been thought, all things considered, to be about the most favorable temperature for good work.

It has been shown in Boston that in those school-rooms, having an average temperature of about 65° F., anemia and nervous diseases were less than one-half as frequent as in those rooms having a temperature of 70° F. or more. In Chicago it was found that in the cool rooms nose and throat diseases existed in only about 2 per cent. of the children; while in the other rooms 40 per cent. of the children suffered from such diseases. Thermometers should be of a certified character, and should be so placed in each room as to give an accurate record of the temperature. They should hang about 4 ft. from the floor, should be on an inside wall, and should be kept away from the wall itself by a bracket. The room temperature should be observed hourly, and should be reported to the school superintendent and engineer.

The principals and teachers of the public schools of Cleveland have started a movement to secure better air in the school-rooms of that city. It has been determined that on account of the heating systems in use in the schools, proper ventilation of the school building is impossible. Therefore, the teachers, backed by the principals, have resorted to a concerted window-opening program. At stated intervals and after the children have prepared for it, a gong sounds and up go all the windows, and are kept open until the rooms are thoroughly aired out. As a rule, while the 'blowing out' process is going on, the children are being put through marching exercises in the rooms or are dismissed to their playgrounds for brief romps in the open air.

When summer schools are held, the air should be cooled by modern cooling devices, or by electric fans, or by both.

Water closets may be in basements, but are better located in isolated towers, or other portions of the building. They should be of the latest sanitary design, well lighted and ventilated, and kept constantly clean. Paper towels should be provided, and children should be taught the necessity of frequently washing the hands, especially after visiting the water closets.

The water supply should be of the purest possible quality, and should be frequently analyzed. Drinking cups should be kept under a constant stream of running water, and many recommend the bubbling fountains, where the water constantly flows upward, so that the pupils may drink without using a cup.

The Chicago Health Department recently examined drinking cups from various places, such as schools, hotels, stores, etc., and found poisonous micro-organisms in all of them; and guinea-pigs injected with such micro-

organisms taken from the cups, either became very ill, or died. Legislation is now pending in various states against the 'public drinking cup,' and it is prohibited by law in Vermont, Colorado, Chicago and other places.

School buildings should be ventilated by the most modern methods, the air should be kept constantly but harmlessly moving, and the entire building should be kept thoroughly cleaned by frequent disinfection, sanitary cleansing, and the most efficient vacuum cleaning. Pencils, books, etc. should be frequently cleansed by subjecting them to formalin vapor. Shower or tank school baths are most desirable features in school buildings, and should be used as much as possible. They should not be compulsory, and they perform a great service in spreading ideas of health and cleanliness among the scholars and their families.

And thus the writer might go on, and for sometime yet, giving suggestions concerning the healthy and hygienic conditions of school buildings, their contents and their playgrounds, etc. They are all intimately connected with the health of the school child, and, therefore, should be under the watchful eye of the medical inspector. But there are other essential elements entering into medical school inspection, which must be considered after a properly located, built and equipped school-house has been handed over to the school authorities, and one of the most important of these elements is the medical school inspector.

(Conclusion in August number.)

PROSTATECTOMY IN THE AGED, WITH A REPORT OF TWO CASES NINETY YEARS OF AGE.

By HARVEY ADAMS MOORE, M. D., of Indianapolis,

Clinical Professor of Genito-Urinary Surgery in the Indiana University School of Medicine, etc. etc.

Stimulated by a personal experience in 2 successful cases of prostatectomy by the perineal route in men ninety years of age, reported in the *Indianapolis Medical Journal*, August, 1909, and July, 1910, the writer undertook a study of the results of this operation in the aged. As one man's experience, no matter how extensive, is necessarily limited, the writer has written to men known to be doing genito-urinary surgery in this country and abroad, requesting them to answer the following questions:—

1. What was the age of the oldest man on whom you have done a successful perineal prostatectomy?
2. How many have you successfully operated, over eighty years of age, by the perineal method, and what were their ages?
3. What was the age of the oldest man on whom you have done a successful suprapubic prostatectomy?
4. How many have you operated on successfully over eighty years of age, by the suprapubic method, and what were their ages?
5. What is your opinion of the advisability of prostatectomy in the very aged?

Of those who favored me with a reply some were unable to furnish the data as requested, and a number have not replied who were requested to do so.

The twenty surgeons who have done a successful perineal prostatectomy gave the highest ages of the patients operated on as follows: Sixty-three, seventy, seventy-one, seventy-four, seventy-six, seventy-eight, seventy-eight, seventy-eight, seventy-nine, seventy-nine, seventy-nine, eighty-one, eighty-two, eighty-two, eighty-two, eighty-three, eighty-three, eighty-eight, eighty-eight, eighty-nine years.

Twelve have done successful perineal prostatectomies on men over eighty. The ages varied as follows: 6 cases at the age of over eighty; 9 at eighty-one; 7 at eighty-two; 2 at eighty-three; 1 at eighty-five; 1 at eighty-seven; 2 at eighty-eight; 1 at eighty-nine; 1 at ninety; 12 over seventy. Of these, two surgeons had 13 cases each; one had 2, one 4, and one 3; the others had one case each.

Two replied, one giving 28 over seventy; the other giving one case at seventy-seven and one at seventy-eight.

Eighteen have performed successful suprapubic operations, the ages varying as follows: 1 at sixty-six; 2 at sixty-eight; 1 at seventy-two; 2 at seventy-five; 1 at seventy-six; 2 at seventy-eight; 2 at seventy-nine; 1 at eighty; 13 at eighty-one; one at eighty-three; one at eighty-four; and one at ninety.

Thirteen have performed a successful suprapubic prostatectomy in men over eighty, the ages of 14 cases reported varying as follows: 10 a little over eighty; 3 at eighty-one; 1 at eighty-four. Of these, three men reported 3 each and one 2 cases.

Twenty-five replied to question 5. Of these all but five expressed themselves in favor of prostatectomy in the aged, when general conditions are satisfactory, and local conditions indicate an operation.

Dr. Miles F. Porter, of Fort Wayne, Indiana* gives the following summary of a study of 485 recorded cases of prostatectomy, occurring in the practice of thirteen different operators. His own 25 cases are also reported. Dr. Porter is quoted here not because the number of cases is unusual, but because of the variety of operators; a few surgeons have reported more cases individually.

The fatalities following prostatectomy are largely due to conditions resulting from the hypertrophy and existing at the time of the operation. Prostatectomy, in the absence of serious complications, entails a risk of life of less than 2 per cent. The death-rate in enlarged prostate treated by catheterization is over 5 per cent. Prostatectomy in enlargement of the prostate adds to the average expectancy of life in these patients and adds to their enjoyment of usefulness. Malignancy is present quite often in enlargement of the prostate thought to be benign in character.

From the very favorable success experienced with a number of cases operated on where the ages of the patients were between seventy and ninety, the writer feels altogether justified in not refusing operation in any case suffering the tortures of this dread disease and offering reasonable hope for recovery.

To illustrate, the following case of a man of ninety years is briefly reported. This patient was referred to the writer in September, 1909. He stated that life was unbearable in his condition, and that if it were possible to be relieved by operation he desired to take the chance.

CASE I.—S., *et. ninety*. First seen September 12th, 1909. No venereal history. Five years ago he noticed burning on urination, and urgency and frequency of urination; it was necessary to void urine twice during the night. These symptoms remained about the same until four months before the date of admission to the hospital, when he began to have considerable obstruction to the passage of urine. His physician at this time passed a sound, which was followed by chills. After this seizure the patient had complete obstruction and required catheterization four to eight times daily. There was considerable dribbling of urine.

At the date of admission to the hospital the patient was having pain in the

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prostate, rectum, and fossa navicularis. He had been vomiting and was greatly emaciated. It was necessary to pass a catheter eight to ten times in twenty-four hours, and the bladder capacity was eight ounces. The urine was foul and contained considerable bacterial flora and further showed quite an involvement of the kidneys. There was a marked degree of arteriosclerosis and an intermittent, irregular pulse. The patient had suffered so much that he preferred death to a continuance of pain.

Operation.—Ether and chloroform were administered alternately. The perineal method with the inverted "V" incision was used. A large spheroid mass was removed from the right capsule; the left lobe was friable and was broken up while being taken out. There was a very small amount of hemorrhage, and shock was very slight.

The writer's two-way perineal drainage tube was removed at the end of twenty-four hours and the patient was able to sit up the second day following the operation. He was able to void urine the first two days following the removal of the drainage tubes with slight pain, and from then on with comfort. At the end of the first week he was walking about in his room and getting in and out of bed without assistance. He left the hospital at the end of the fourth week with complete control of the urine, and greatly improved general health.

When last heard from, January, 1913, he stated that the perineal wound had remained closed; that he could void urine naturally at intervals of every three to four hours; that he did not suffer any pain; that he had gained in weight, and that his general health was good.

CASE II.—R., *et.* ninety. Family history, negative. Usual diseases of childhood; no venereal history. First examined at Deaconess Hospital, Indianapolis, February 3rd, 1912. Frequent nocturnal urination for three years. Difficulty of urination first noticed one year ago, which had continued to date. Four days before admission to the hospital, after exposure to the cold weather, he was catheterized for the first time. Was unable to void urine afterward.

Operation.—Gas-oxygen anesthesia. The perineal method with the inverted "V" incision was used. Patient recovered without shock. Continuous bladder irrigation was maintained for twenty-four hours through the two-way catheter and the tube then was removed. The patient sat up in bed the second day following the operation. At the end of the first week the patient was able to walk about his room unaided. The urine began to flow through the urethra on the twelfth day, and on the twenty-first day all the urine passed normally.

At present this patient has complete control of the urine, which he voids without the slightest difficulty.

CONCLUSIONS.

1. The catheter treatment of enlarged prostate is, like the opium and poultice treatment of appendicitis, unsurgical and unsafe.

2. Prostatectomy is the best treatment for enlarged prostate.

It would appear from the foregoing that prostatectomy in the aged is nearly as safe as it is in younger men, and is good surgical practice wherever indicated, and whenever the physical condition of the man will warrant it. It appears that the consensus of opinion is that age is no bar to prostatectomy, and should be performed whenever practicable. It is, indeed, remarkable to see how rapidly these very old, and often very infirm, men convalesce.

THE NASAL SEPTUM AND ITS RELATIONSHIP TO THE SYNDROME OF SPHENOPALATINE GANGLION NEUROSIS.

By JOHN JOHNSON KYLE, M. D., of Los Angeles,
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In the consideration of his subject, the writer does not propose to take up the discussion of the different forms of deflection of the septum or the operative technique of the same other than to refer briefly to the care of the mucosa at the line of incision and to emphasize a practical method of securing local anesthesia. In the discussion of local anesthesia and nasal neurosis it is necessary to review briefly the anatomy of the nerves which are found in the nasal cavity and to discuss some of the sequelæ which follow any unnatural irritation of the same.

Some American writers* make the assertion that a deflected septum is not a pathological condition, only becoming such when it interferes with the air currents through one or both sides. A comparison of the normally thin vertical septum with a thickened and somewhat bowed septum in which the currents of air do pass freely suggests that any departure from the normal renders the septum a pathological one. Thickness of the septum is due to localized perichondritis or chondritis, and if in bone, to an osteitis, due to some local or general infection, and originating sometimes from a sinus disease.

Not infrequently in the submucous operation sections of cartilage and bone are removed varying in thickness from 2-4 mm., while in old patients with history of syphilis the bony septum is found to be thickened and sclerosed, the bone being so hard that it is impossible to bite through with a Ballenger forceps.

An x-ray photograph will give the operator a good idea of the size of the thickness of the septum and its upward extension. In removing the deflection it is unnecessary to go higher than the deflection. Miodowski, of Breslau,** calls attention to the danger of elevating the mucous membrane to the region of the expansion of the olfactory nerve, for fear of infection spreading to the meninges by way of the cribriform plate and olfactory bundles.

Sometimes the cartilaginous septum at its posterior part has been replaced by bone. Under such conditions the cartilaginous septum is one-fourth to one-half its normal thickness. The question of the age at

*Charles W. Richardson (*Amer. Journ. Med. Sciences*, 1909).

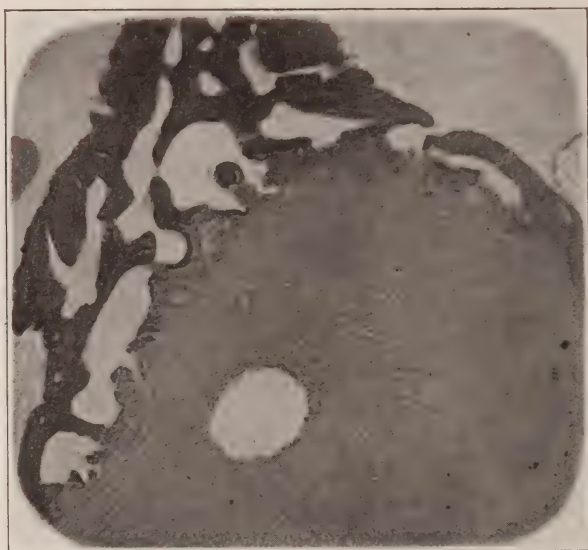
***Zeitschr. fuer Laryngologie, Rhin., und ihre Grenzg.*, December, 1912.

which the operation can be performed with safety deserves some consideration.

The nasal cavity with all its accessory cavities is completely formed at about the twenty-fourth year, and were it not that frequently the septum begins its malformation long before this age is reached and that its growth under such conditions possibly affects the adjacent structures, operative procedure before the twenty-fifth year would be contraindicated.

A deflected septum in early life, if pronounced enough to attract attention, should be operated regardless of age. As far as the writer's experience goes, old age is no contraindication for the operation.

The value of suggestive therapeutics should not be overlooked in those cases in which an unstable nervous system is present, due to prolonged



Section of the thickened nasal septum showing unusual capping of the cartilage by vertical plate of the ethmoid. Magnified twenty times.

intranasal irritation. The writer does not think we can lay too much stress upon the necessity of suggestive treatment and the indication of dogmatic assertions relative to the relief that should follow the operation.

The nasal nerve is the first sensory nerve we have to consider in operation upon the septum. It enters the nasal cavity through a slit on either side of the crista galli, after which it subdivides into three branches: an internal or septal, an external, and an anterior. The septal branch is quite large and can be easily separated from the adjacent tissues. It closely follows the line of junction of the cartilage with the bridge of the nose beneath the mucous membrane. Sensation is supplied by the nasal nerve to the anterior half of the nasal cavity and floor of the nose. If we keep this in mind and inject two or three drops

of a 1 per cent. solution of cocaine, to which has been added a drop or two of adrenalin, high up and along the course of the nerve, complete anesthesia of the mucocutaneous junction, the line of usual incision, is secured. It is not only unnecessary, but dangerous, to apply crystals of cocaine to the mucosa of the septum.

The external branch supplies sensation to the anterior tip of the middle and lower turbinal and the lateral wall of the piriform opening. Anesthesia of this side of the nose can also be secured by the injection of a few drops of a 1 per cent. solution of cocaine. The superior and posterior parts of the septum are supplied by the superior nasal and septal branches of Meckel's ganglion, which pass to the nose through the sphenopalatine foramen.

The nasopalatine, or nerve of Cotunnus, reaches the anterior floor of the nose via a small groove in the vomer and communicates with the anterior dental nerve. To anesthetize the septal branch, a syringe to which has been attached a small barrel about $1\frac{1}{2}$ in. long, is necessary so that the needle can be inserted beneath the mucosa high up into the attic of the nose posterior to the anterior tip of the middle turbinated body. Previous to the injection the parts in the region of the nasopalatine nerve may be partially anesthetized with a topical application of a 10 per cent. solution of cocaine on an applicator. The same technique must be carried out on the opposite side of the nose. If the anterior convexity is so great that the needle cannot be inserted into the mucosa in the region of the septal branches, a 20 per cent. solution of cocaine may be applied. This will give sufficient anesthesia to enable the operator to separate and remove the cartilaginous crest, when a few drops of a 1 per cent. solution of cocaine may be used with the syringe, and the operation continued. Complete anesthesia with little absorption or paralyzing effect of the drug upon the epithelium is what we want in all operations in the nose.

The anterior tip of the middle turbinated and superior turbinated bodies, and the ethmoid cells are supplied by the superior nasal nerve. The orbital branches from Meckel's ganglion pass from the orbit through the posterior internal canal and supply sensation to the sphenothmoidal recess and sphenoid cells. This nerve, as well as the nasal nerve, may be anesthetized in the orbit and at its entrance through the anterior and posterior internal orbital canals.

Broeckhaert, in a discussion of regional anesthesia,* says in referring to the orbital branch, that the needle is applied perpendicularly at the superinternal angle of the orbit, at the extremity of an imaginary line representing the depression which unites the root of the nose with the frontal region. After piercing the skin the sensation is of being in a free space. We now seek to penetrate between the bone and the periosteum, the needle being made to scrape the surface of the bone. In this layer it is inserted to a depth of between $2\frac{1}{2}$ and 3 cm. As it

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advances (the liquid being injected as it goes along) the point of the needle is inclined successively up and down so as to insure its contact with the nerve trunk, which is stretched out horizontally between the periosteum and the anterior orbital foramen. With experience one learns to recognize the sensation of the needle in contact with the nerve.

Following the removal of the bony and cartilaginous septum the wound at the mucocutaneous junction should be closed with small plain catgut sutures, thus preventing scabbing and assuring quick repair. Many specialists overlook this important step in the technique of the operation.

Among the sequelæ of deflection is atrophy of the bone and of the mucous membrane of adjacent tissues. A deflection of the turbinated bodies may also occur. Structural change in the bone and mucous membrane is probably due to irritation of the vasomotor system, not alone from pressure, but from lack of normal aëration of the nose. If the nose is partially or totally occluded, as soon as the deflection is removed an immediate change in the color of the mucous membrane is seen, and with restoration of the normal calibre of the nose a swelling of the turbinal mucosa is noted. With the swelling, the glands and mucous membrane begin to functionate.

The majority of cases of neurosis of the nasal nerve and sphenopalatine ganglion are of the non-suppurative type and thus more difficult to diagnose. Probably the same atrophic or non-functionating condition extends to the air-cells of the diseased side, causing a negative or positive pressure, a condition described by Sluder, of St. Louis. Swelling and anemia of the mucosa differ very little in their effect upon an already unstable nervous system. The vasomotor and trophic systems are profoundly influenced by nasal pressure and occlusion from a deflected septum. Some of the symptoms of irritation of the sympathetic system are constriction, mental apathy, a feeling of fullness in the attic of the nose and sometimes nausea and skin manifestations (erythematous in character), characteristic of a pronounced vasomotor disturbance. Additional symptoms of pressure are asthenopia, migraine, an occasional feeling of constriction, and pain in the eye-ball, temple and forehead. The amount of pain varies in individuals, depending upon the exact point of pressure and the degree of negative and positive pressure within the sinuses. In a patient with a predisposition to an unstable nervous system, an inability to fill the lungs upon inspiration, a peculiar sensation of fullness in the head, and shooting pains through the forehead at times, may predispose to morbid fear and introspection. We cannot look upon the enumerated nasal symptoms as a so-called neurosis, for in a great majority of cases the pain in the area supplied by the trifacial nerve has a distinct local origin and the neurosis is only an expression of the local irritation.

Deflection of the septum is usually due to trauma, though irregular development of the nose, septum, and roof of the mouth may account for

some of the deformities observed. Unequal atmospheric pressure in the nose may predispose to a deflection of a septum that is naturally thin and fragile. A deflection of the septum from any cause, especially if due to faulty atmospheric pressure, has a tendency to grow, and it is sometimes only late in life that symptoms of pressure are complained of. An old fracture of the septum can be differentiated, the writer thinks, from a bowing of the septum from pressure or unequal development. In fracture the cartilaginous parts are never firmly united. If low down, the nasal spine of the upper jaw is imperfectly united to the cartilage, and not infrequently there is an over-riding of the cartilage and bone. In some cases hypertrophy of the cartilage and bone may be found and in other cases a sclerosis of the bony septum and cartilage. This condition is frequently found in patients who have had syphilis in early life. A localized perichondritis from any cause may predispose to a deflection. The writer has never been able to decide positively whether a hypertrophy of the lower turbinated body of one side, which is so often present, predisposes to a deflection of the septum, or the deflected septum caused the hypertrophy of the turbinated body.

The disagreeable symptoms of hypertrophy vary somewhat according to the portion of the septum involved. Anterior deflection, or deflection which presses upon the region of the anterior tip of the lower turbinated body or lateral wall of the piriform opening of the nose, does not give rise to the local and general symptoms which are observed when the septum presses upon the middle turbinated body. Anterior pressure may so occlude the nasal passage as to cause deflection of the nose, difficulty in filling the lungs, catarrhal deafness and nasal tones. The so-called reflex symptoms are usually absent. Symptoms of pressure in the region of the nasopalatine nerve and in the branches of Meckel's ganglion which supply the anterior portion of the middle turbinated body produce the syndrome of sphenopalatine neurosis. In addition to pressure and irritation of the sensory and sympathetic fibres, we have pressure upon the olfactory nerve filaments. With irritation of the complicated nervous mechanism of the attic of the nose, the impressions are easily carried by way of the trifacial nerve to the nuclei of the facial and vagus nerves in the medulla. The result of irritation of the motor, sensory, and sympathetic nerve fibres is far reaching and nutritive cardiovascular changes are to be expected.

Sendziak and others have already called attention to the influence of hypertrophy of the lower turbinated bodies upon the thyroid gland, and Williams has remarked upon the fall of blood-pressure while elevating the mucoperichondrium in the submucous resection of the septum. If

all this be true, the nose is entitled to more consideration in the rôle of a cause of many obscure neuroses.

In a given case of sphenopalatine ganglion neurosis in which there is any departure from the normal high up in the septum, the septum should be operated upon first, and the middle turbinated body or sinuses later, if the symptoms persist. When indicated, there is no operation within the nasal cavity that gives happier results than a submucous resection of the nasal septum.

702 Title Insurance Building.

A FATAL CASE OF OIL OF CEDAR POISONING.*

By R. L. THOMPSON, M. D., AND J. S. ARCHIBALD, M. D., of St. Louis.

Mrs. E., *æt.* twenty-two. Found dead in bed by her husband at 12:30 a. m., who had left her in perfect health at 7:30 that same evening. The patient was found in her night-clothes, lying partly out of bed, and there was a small amount of vomitus on the floor which was tinged with blood. Previous health excellent. There was a history of one month's suppression of the menses. At the inquest the fact was brought out that she had at previous times made use of cedar oil, but with no ill effects.

POST-MORTEM FINDINGS.

Autopsy, performed twelve hours after death, showed the following: Body well developed and nourished. Pupils equally dilated, measuring 5 mm. in diameter. Jaw rigid, and the tip of the tongue protruding slightly from between the tightly clinched teeth. A small amount of blood-tinged foam about the lips.

Abdominal Cavity.—The peritoneum is smooth and glistening. The vessels of the omentum, mesentery and pelvis are deeply injected. The serosa of the small intestines appears normal; there are distinct areas of reddening of the large intestine.

Pericardial Cavity.—Contains about 10 c.cm. clear straw-colored fluid. Normal.

Heart.—Normal size. Moderate amount of subepicardial fat. Myocardium, endocardium and valves appear normal.

Lungs.—Pleura smooth, lungs voluminous, grayish-pink in color, shading to darker red in the more dependent portions. Air-containing throughout. On section, much blood and blood-tinged, frothy mucus exudes. The bronchi are greatly reddened.

Liver.—Slightly enlarged; surface smooth and dark red in color. On section, blood flows freely from the cut vessels. Markings are normal, save for the intense congestion.

Gall-bladder and bile-ducts normal.

Pancreas, normal.

Spleen, normal size; capsule, smooth; shows on section intense congestion.

Kidneys, slightly enlarged; dark red in color; capsule strips easily, leaving a smooth surface. On section both cortex and medulla show intense congestion.

*From the Department of Pathology, St. Louis University School of Medicine.

Stomach.—Vessels of lesser and greater curvature show intense congestion; serosa reddened. On opening the organ a strong odor of cedar oil is evident. The gastric mucosa shows everywhere a red color varying from pink to deep red. An area along the middle part of the greater curvature presents distinct ecchymoses, bright red, somewhat stellate in shape, and varying from nearly pin-point to pin-head size.

Intestines.—The mucous membrane at the beginning of the duodenum is somewhat reddened; the remainder of the gut is practically normal. The mucosa of the large intestine presents diffuse areas of congestion, irregularly scattered throughout.

Bladder, empty. Mucosa shows some congestion.

Uterus.—On opening the organ an ovum is found 2 cm. in diameter, dark red in color. On opening the sac this is found to be broken down and hemorrhagic. The endometrium is very soft and degenerated. The vessels in the wall of the uterus are greatly distended. The ovaries and tubes show deep congestion; the right ovary is enlarged and presents on section a corpus luteum 2 cm. in diameter.

Head.—Dura normal. Vessels of pia intensely congested. Brain substance somewhat edematous. On section puncta cruenta prominent; basal ganglia, normal; pons and medulla, normal.

Arteries, normal.

MICROSCOPICAL EXAMINATION.

Microscopically there is little to be added to the above protocol for the parenchymatous organs. The heart is negative. Scharlach R. stain fails to show fat.

Lungs.—Both the larger vessels and the intra-alveolar capillaries are filled with red blood corpuscles, some of which are also found free in the alveoli.

Liver.—The liver cells are larger and paler than normal, with the cell membrane showing distinctly, owing to the peculiar granular degeneration of the cytoplasm. The capillaries and larger vessels are distended with blood.

Spleen.—Negative save for intense congestion.

Kidneys.—Both the larger vessels and finer capillaries in cortex and medulla distended with blood. Red blood corpuscles found free in tubules. There is marked degeneration of the epithelium of the convoluted tubules. The glomeruli are about normal size, some deeply injected.

Uterus.—The most striking picture of intense congestion is shown, particularly in the lower layer of the muscularis adjacent to the mucosa. The uterine mucosa adjoining the layer shows the characteristic changes of early pregnancy. The glands are elongated, narrow, sometimes contorted, and the lining epithelium shows in places typical 'saw-edge' appearance; in many places the epithelium has broken away from the basement membrane and lies free. Only a few of the cells maintain a

cylindrical shape; for the most part they are extremely irregular, showing all stages of degeneration. The nuclei are, for the most part, indistinct or altogether lacking. There is, in general, a failure of the mucosa to take the stain in the hematoxylin-eosin sections, so that it has a grayish indistinct appearance in sharp contrast to the muscularis.

CONCLUSIONS.

In certain localities, and among certain classes of people, oil of cedar has been quite generally used as an abortifacient. In most instances the drug seems to be harmless, both to the individual and to the fetus. Occasionally, however, as in the present case, a small dose acts as a fatal poison; and strangely enough, as also in the present case, a person, who has been a more or less habitual user at monthly periods without ill effect, may succumb to a small dose. Owing to these peculiarities of the drug, a few experiments were attempted on dogs. These, so far, only serve to bear out the severe action, or the complete lack of action, that may follow the ingestion of oil of cedar.

So far, in the animals used, we have been unable to kill with the first dose. We have given rather large doses in several instances without result; but have killed the same animal by a smaller dose from one to three days later. For instance, a dog was given 1 oz. of oil of cedar at 10 a. m.; this was followed by restlessness and some vomiting; at 12 o'clock another ounce was given with the same effect. At 10 o'clock the next day another dose was prepared; when 10 drops were taken the dog fell into convulsions and died in about two hours.

The autopsy findings in these dogs correspond very closely to those in the human, which have been already described.

Since attention has been called to drug hypersensitiveness, more and more cases of poisoning are coming to our knowledge, which have to be considered as anaphylactic phenomena. Among these drugs we already have iodoform, iodides, antipyrine, and arsenic (salvarsan and neosalvarsan). It seems from the above case that oil of cedar may be included in this list.*

*Thanks are due Dr. Louis R. Padberg, Coroner of St. Louis, for the use of records in this case.

NEW VIEWS ON THE SYPHILITIC PARASITE.

By AUGUSTUS K. DETWILER, M. D., of Omaha.

From the Middle Ages, when Fracastorius named the Neapolitan disease, until the present when Noguchi cultivated its parasite, syphilis has been studied, discussed and, perhaps, been the disease of some of the most distinguished men of our own profession and of others in every age; hence, the dictum, know syphilis and you know medicine, is as true to-day as the day it was uttered.

From 1879, when Klebs looked in vain for the bacterium of syphilis, to 1912, when McDonagh and Ross demonstrated the different phases of the living parasite, the organism of syphilis has occupied many investigators. Ehrlich's discovery that certain drugs were, in the main, organotropic and others parasitotropic, as well as his triumph in the biological chemical therapy of syphilis, gave a tremendous impetus to the study of parasitic protozoology.

Although the spirochæta pallida was discovered in 1906, and the acetone gentian violet and Giemsa stains give fairly satisfactory results in a short time, and transverse illumination shows them at once, when present, yet the difficulty of demonstration, even in undoubted cases, has led to the Wassermann reaction so as to determine by chemical means the presence of the organisms when they cannot be found themselves.

Many observers have thought for a long time that the spirochæta pallida, as such, was not the sole cause of the protean manifestations of syphilis. It did not satisfactorily explain the long incubation period; it did not account for its rarity or even impossibility of demonstration in some lesions (gumma) and its scarcity or entire absence in obvious sores and rashes; and, in any event, it was not found in numbers proportionate to the severity of the disease or the gravity of the symptoms and lesions. Where one expected spirochætæ to be abundant in undoubted lesions, they were found with difficulty or not at all, and they sometimes appeared in great numbers in insignificant lesions.

Alexander Maclellan* described and figured small granular bodies and other forms found with the spirochætæ, as well as independent of them, in syphilitic lesions. In 1905 and 1906, Siegel** described the Cytoryctes luis and the spirochætæ. Schaudinn† investigated Siegel's work, but discredited it. Yet, a few months later, he announced his

**British Med. Journ.*, May 12th, 1906.

***Abhandlung. der kœnig. preuss. Akad. d. Wissenschaften*, Ab. III, s. 1-15, 1905. *Muench. med. Wochenschr.*, p. 63, 1906.

†*Arbeiten aus dem kaiser. Gesundheitsamte*, Bd. 22, pp. 527-34, 1905. *Deutsch. med. Wochenschr.*, p. 711, May 4th, 1905.

famous discovery of spirochætæ swimming free in the fluids of syphilitics, and called them spirochætæ pallidæ. These observations were confirmed by Metchnikoff and Roux,* whose supplementary inoculation experiments in apes, caused its general acceptance.

It seems probable now that Siegel, Maclellan, and Schaudinn can each claim to have discovered and described a phase of a parasite found in syphilitics. We now know that these phenomena were explained by Balfour in the work on spirochitosis of Sudanese fowls in the Wellcome Laboratory at Khartoum in 1908.

Cropper likewise found in his work on the protozoal parasites of guinea-pigs, rabbits and earth-worms that the spirochætæ is but one phase in the development which includes the various stages of free forms and cellular inclusions as well.

McDonagh** first described the developmental stages of the syphilitic organism in the light of these developments in parasitic protozoology.

But it was not until E. H. Ross applied the jelly method of H. C. Ross† to the blood, scrapings from lesions and glandular juices of



Fig. 1.—Small parasite; intracellular; found in chancres.

Fig. 2.—Free forms, round and pear-shaped; granular and at times showing ameboid motion.

Fig. 2a.—Granules in motion.

syphilitics, that the stages were observed and followed with any satisfaction, for the bodies examined by the usual methods of drying and fixation appeared usually as mere opaque and poorly stained patches. This jelly method was devised for the study of the living, stained leucocyte, and was first used in parasitology to study, in the mononuclear leucocyte of the blood of guinea-pigs, the inclusions known as Kurloff's bodies; and it was shown by Cropper and others that these were not vacuoles but living parasites, named lymphocytozoon cobayæ. "It [the jelly method] showed how the chromatin within the inclusion becomes formed into spore-like bodies, as well as coil-like masses, and how, after the inclusion has burst, the spirochætæ swim freely away, and may be seen as motile filaments in the blood of guinea-pigs." Ameboid forms were also observed. It was suggested by Sir Ronald Ross that the spirochætæ were microgametes and might be the cause of the white tumors in the liver and

**Acad. de Méd. de Paris*, May 16th, 1905.

***Lancet*, October 12th, 1912.

†*Lancet*, January 16th, 1909, and elsewhere.

spleen of infected guinea-pigs; and such is found to be so. Recent observations by Cropper point to the transfer of these parasites from guinea-pig to guinea-pig by coitus, and also from mother to offspring, as they have been found in the peritoneal cavity of the newly born guinea-pigs.

Cropper has also demonstrated* in the vesiculæ seminales of earth-worms, parasites similar to Kurloff's bodies or granules, and developing into spirochætæ, which are found swimming free in the seminal fluid of the infected earth-worms, and are called lymphocytozoon lumbrici. A species is found in rabbits—lymphocytozoon leporis; and in rats—lymphocytozoon muris. All these species of lymphocytozoa resemble each other, and each possesses gametes not distinguishable from spirochætæ; and the animals infected—rabbits, guinea-pigs and rats—show lesions and tumors resembling each other and human syphilis, and likewise amenable to treatment by mercury and arsenic.



Fig. 3.—Ameboid leucocyte; inclusion showing coil formations attached to chromatin.

Fig. 3a.—Ameboid leucocyte and free forms.

Fig. 4.—Blood from papule, showing division of chromatin and formation of free forms.

A review of these recent developments led E. H. Ross to apply this method to the study of syphilis.

In chancres, granules, similar to the infective granules found by Bal-four and Henry in fowls, as well as cellular inclusions resembling Kurloff's bodies, were found at once.

The specimen of blood or secretion to be examined is placed upon the jelly in a thin film under the cover-glass and shows under the microscope the characteristic parasites. They appear as copper-colored bodies, either free or within the cytoplasm of the mononuclear cells. This method shows that the chromatin within the cellular inclusion forms spirochætæ-like bodies which, upon bursting of the inclusion, swim freely in the blood. The intercellular forms, multiple or single, are found within the cytoplasm of the large mononuclear lymphocytes, and may have from

*Proceedings Royal Society. Quoted in *British Med. Journ.*, p. 1654, December 14th, 1912.

one to twelve chromatin masses. These resemble the extracellular forms and are round or pear-shaped. In some cases these chromatin masses become curled and twisted coils which break up into spirochæta-like tails when the inclusion bursts. McDonagh explains this as follows: "The sporozoite or infective granule gradually develops, within the leucocyte or connective-tissue cell, into immature male, female or asexual bodies. The male gametocyte, breaking forth from the connective-tissue cell, enters the mononuclear leucocyte, where it develops into several deeply-staining pear-shaped bodies, one of which may be transformed into a coil, from which, on bursting, spirochætae escape. The female gametocyte, on becoming extracellular, grows to the size of a red cell; and the spirochæta has been seen by McDonagh to enter it, and after fertilization two polar bodies were extruded. The network in the cell becomes deeply stained and divides into sporoblasts, or forms large or small spore cysts full of them.

"The female cells may divide also by parthenogenesis and the asexual body may develop into a spore cyst when its host cell degenerates. As far as is known by observation and analogy, the infecting material is probably not only the spirochætae, but also the infective granule or the



Fig. 5.—Extrusion of parasite.

small, round, or pear-shaped bodies, which are so numerous, and which correspond to the sporozoite of the other lymphocytozoa. These are motile. They may have flagella, and they have been seen to enter the leucocytes, as well as lying within the connective-tissue cells."

These bodies have been observed at different times in recent years by others, but the relations between the various bodies described and the spirochætae have not hitherto been demonstrated and explained. Ross points out the homologue between the other lymphocytozoa and the human syphilitic parasite, as now demonstrated, and calls it lymphocytozoon pallida; and he believes that the spirochætae are really the male elements or microgametes, and that they have not been seen to divide, and that the round or pear-shaped bodies are the macrogametes or female elements, or asexual forms.

The technique of H. C. Ross' jelly method, as described by him and by E. H. Ross,* applied to syphilitic material, is as follows:—

Agar 1 grm., sodium chloride .5 grm., polychrome methylene-blue 4 c.cm., distilled water 100 c.cm.; boil, filter and store in test-tubes. When

**British Med. Journ.*, December 14th, 1912.

required for use the jelly is boiled, and when melted a drop is poured on a microscope slide and allowed to spread out into a thin film and cool and set. The syphilitic material to be examined—a drop of blood, scrapings from a sore, or juice squeezed from a gland—is mixed on a cover-slide with 3 per cent. solution of sodium citrate in distilled water and then inverted on the set jelly.

The writer has repeated this technique and here describes the bodies as he has seen them working with the jellies. On the jelly, the cells and leucocytes stain a general blue, while the bodies appear deeply stained round or oval, lying in the mononuclear leucocytes or free in the plasma (Figs. 1 and 2); they are from 2-10 microns in diameter; larger bodies from 6-15 microns in diameter, without a nucleus and filled with granules, sometimes in active motion (Fig. 2a); deeply-staining bodies in the protoplasm of large cells with distinct round or pear-shaped chromatin structure (Fig. 4); bodies with red staining masses which on closer examination show chromatin coils or threads either inside or outside, but



Fig. 6.—Ruptured spore cyst.

Fig. 7.—Sporoblasts.

attached to the inclusion (Fig. 3); body free and within ameboid leucocytes (3a); large bodies seen in old case resembling spores or spore cysts (Figs. 6 and 7); parasite escaping from the cell (Fig. 5).

At present, it is too soon to be certain that the presence of this organism in the sores or blood can be used as a means of diagnosis in syphilis; but the method is so simple and the picture so distinct from the ordinary blood slide, that one has only to see the phases, as shown in the figures, to assure oneself that we are here on the trail of the development of the causative agent of the disease. In chancre and enlarged glands the finding is easy; but, in the blood of old cases and those under treatment, much time may be needed. As a working suggestion, E. H. Ross advances the hypothesis that the guinea-pig or rabbit parasites might be used to produce in man a mild infection or a modified syphilis, which would produce immunity to, or modify the disease in the same way that vaccina modifies variola.

MEDICAL AND SURGICAL PROGRESS.

ARTIFICIAL PNEUMOTHORAX AND OTHER SURGICAL METHODS IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

A REVIEW OF RECENT LITERATURE.

By ALBERT E. TAUSSIG, M. D., of the Editorial Staff.

1. Aron: Pneumothorax Therapy. (*Berl. klin. Wochenschr.*, No. 7, p. 305, 1913.)
2. Brauer and Spengler: Treatment of Pulmonary Tuberculosis with Artificial Pneumothorax. (*Beiträg. zur Klin. der Tuberk.*, Vol. 19, No. 1, p. 1, 1911.)
3. Deneke: Artificial Pneumothorax. (*Zeitschr. fuer ärztl. Fortb.*, No. 18, p. 546, 1911.)
4. Forlanini: Artificial Pneumothorax. (*Ergebn. der inn. Med.*, Vol. 9, p. 621, 1912.)
5. Von Jagic: Indications for Artificial Pneumothorax. (*Wien. klin. Wochenschr.*, No. 6, p. 379, 1913.)
6. Lapham: Treatment of Pulmonary Tuberculosis by Compression of the Lung. (*Journ. Amer. Med. Assoc.*, Vol. 59, No. 11, p. 866, 1912.)
7. Murphy: Surgery of the Lung. (*Journ. Amer. Med. Assoc.*, Vol. 31, No. 4, 1898.)
8. Piéry and Le Bourdellès: The Clinical Results of Forlanini's Cure. (*Gazette des Hôpitaux*, No. 2, 1913.)
9. Rénon: Artificial Pneumothorax in Acute Tuberculosis. (*Archiv. gén. de méd.*, No. 10, p. 918, 1912.)
10. Robinson and Floyd: Artificial Pneumothorax. (*Arch. Int. Med.*, No. 4, p. 452, 1912.)
11. Sauerbruch: Phrenicotomy. (*Muench. med. Wochenschr.*, No. 12, p. 625, 1913.)
12. Sauerbruch and Elving: Extrapleural Thoracoplasty. (*Ergebn. der inn. Med.*, Vol. 10, p. 869, 1913.)
13. Wilms: Extrapleural Thoracotomy. (*Muench. med. Wochenschr.*, No. 9, p. 449, 1913.)
14. Daus. (*Therap. der Gegenw.*, No. 5, 1909).
15. Forlanini (*Ergebn. der inn. Med.*, 1912).
16. *Internat. Zentralbl. fuer die Gesamte Tuberk. Forsch.*, Vol. 6, No. 9 and Vol. 7, No. 1.

The literature of artificial pneumothorax, scanty a few years ago, is increasing by leaps and bounds. Reports of cases, so treated, and modi-

fications of the technique are constantly being published, so that a partial bibliography of recent articles on the subject nearly filled an entire number of *Brauer's Beiträge* recently issued. The matter is made still more complex by the fact that the clinicians, whose experience in this field is greatest, often differ more or less radically as regards technique, results and indications for the treatment. A brief and somewhat critical review of recent literature, covering not only artificial pneumothorax, but also the other surgical procedures, suggested for the treatment of advanced pulmonary tuberculosis, may be of service.

HISTORICAL.

The fact, that the occurrence of a pneumothorax in the course of pulmonary tuberculosis is often followed by a great improvement or even cure of the tuberculous process, has long been known. Stokes was one of the first to report a case of this sort and cites a similar case of Houghton's. Adams, Wintrich, Traube and, since then, many others have reported cases of this kind without, however, drawing any therapeutic conclusions from their observations. This is the less surprising, since, while it is true that a pneumothorax sometimes exerts a beneficial influence upon the tuberculous process, this accident is far more frequently an extremely grave one and, often enough, is promptly followed by the death of the patient. It has since then been shown that it is the closed pneumothorax that exerts a beneficial influence, whereas those with a patent or valvular opening represent a much more serious complication.

The first to suggest the production of an artificial pneumothorax for therapeutic purposes was Carson, of Liverpool. Impressed with the fact that a pulmonary abscess could be made to heal with much less difficulty if its walls could be approximated, he advocated, in the early twenties of the nineteenth century, the production of a pleural fistula in such cases, thus inducing a collapse of the affected lung. The suggestion apparently was never carried out but was generally denounced as impracticable, and that with some justice. For not only did Carson's suggestion fall within the pre-aseptic era and thus involve almost certain pleural infection, but it also called not for a closed but for an open pneumothorax, with all the dangers incident to the latter. Many years later, in 1885, Cayley used this method in a young consumptive, with profuse, intractable hemoptysis. He introduced a metal catheter through the sixth intercostal space into the pleural cavity and left it *in situ*. The lung collapsed and the hemorrhage ceased, but soon after fever set in and a secretion began to flow out of the tube which had to be removed. The attempt was apparently not repeated.

The credit of introducing the therapeutic pneumothorax, in the modern manner, belongs to Forlanini, of Pavia. In 1882, he published a number of communications, advocating the injection of air into the pleural cavity through an aspirating needle, in cases of unilateral pulmonary tuberculosis. Little or no attention was paid to the suggestion, and it was not until 1888 that he himself ventured to carry out his method in a case of unilateral phthisis with pleuritic effusion. His pupils, Riva-Rocci and Cavallero, from time to time, published experimental and clinical studies of the method, without, however, attracting much attention until nearly twenty years later.

In 1898, Murphy, of Chicago, in the course of an address on "Surgery of the Lung," delivered before the American Medical Association, dis-

cussed the treatment of tuberculosis of the lung by means of the repeated production of a pneumothorax on the diseased side. He apparently did not know of Forlanini's work and his method was a somewhat different one. By means of an incision through the skin and a dissection of the intercostal muscles he laid bare the parietal pleura. This he pierced with a blunt trocar and then injected enough nitrogen gas to produce complete collapse of the lung on that side. A year later, his assistant, Lemke, reported a series of 53 cases so treated and Schell reported a case of severe hemoptysis in which the method was used successfully.

For a number of years thereafter, the method, if not forgotten, at least disappeared from the literature until Brauer, in 1906, reported a number of cases so treated, with satisfactory results. Since then the method has rapidly grown in favor, until now, in many tuberculosis sanatoria and clinics, it has come to be almost a matter of routine. There is not as yet, however, any universal agreement as regards either indication or technique. There is a considerable number of cases, in which the production of an artificial pneumothorax is impossible, on account of extensive adhesions. For these, other surgical measures have been advocated, among them thoractomy, extrapleural thoracoplasty and phrenicotomy, which will be discussed in some detail below.

INDICATIONS.

When a sufficient amount of nitrogen has been injected into a pleural cavity, free from adhesions, the lung on that side, by virtue of its elasticity, collapses and lies against the hilus, like a squeezed-out sponge. Practically, especially in cases of tuberculosis, this complete absence of pleuritic adhesions will rarely be found; still the fewer and the less firm adhesions, the more nearly complete will be the collapse of the lung. The behavior of such a collapsed lung differs in many important respects from that of an active lung. It rapidly becomes nearly or quite empty of air. Cavities, if there are any, collapse, their walls approximate each other and their contents are squeezed out. It is probable that there are radical circulatory changes in such a lung, although, as yet, we know little about them. The fact that a pneumothorax of long standing is often followed by a hypertrophy of the right ventricle, points to an impaired circulation in the collapsed lung. The experiments of Shingu have shown that the lymph-stream is very sluggish in such a lung. There seems then to be a general impairment or cessation of all forms of physiological activity in the collapsed lung, a condition long known in other tissues to be favorable to the cure of a tuberculous infection. The ideal indication for the performance of artificial pneumothorax is thus an advanced pulmonary tuberculosis, with one or more cavities, strictly localized to one side and with little or no involvement of the pleura. Obviously, this ideal condition will rarely be found, and different clinicians vary in their willingness to stretch the indications. Aron would hold very strictly to the indication already stated. Forlanini and Brauer, whose experience with the method is especially large, are less rigid in their requirements. The former summarizes his attitude as follows:—

1. The tuberculosis must have the character of a true phthisis, that is, the process must be advanced and must involve destruction of pulmonary tissue. He would exclude from the treatment not only all early cases, but also all acute ones.

2. The adhesions must not be so firm or so extensive as to render the

production of a voluminous pneumothorax impossible. The condition cannot always be made out in advance. Except when there is a nearly complete obliteration of the pleural space, an attempt at producing a pneumothorax can always be made.

3. The method is contraindicated if there are severe circulatory disturbances.

4. The ideal indication for an artificial pneumothorax is doubtless a strictly unilateral pulmonary tuberculosis. In such cases we are most justified in looking for a complete cure. Still this does not exhaust the indication. There are now many cases on record of advanced tuberculosis of one lung, with a slight involvement of the other, in which an artificial pneumothorax on the severely infected side was followed by an apparently complete recovery of the other lung. Even where the second lung is in an advanced stage of tuberculous disease, good results from artificial pneumothorax have been observed. Possibly the fact that the absorption of toxins from the worse lung has ceased, may enable the other lung the better to recuperate. Forlanini reports one such case which is now apparently on the road to clinical recovery. He concludes that involvement of the other lung does not constitute a contraindication to artificial pneumothorax. Only we must remember that the more advanced the infection of the other lung, the less we are justified in our expectations from the treatment.

Some years ago an interesting communication by Da Gradi, an assistant of Forlanini, showed that laryngeal tuberculosis was often favorably influenced by the artificial pneumothorax, and Courmont, somewhat later, reported a similar experience. There is reason to believe that a tuberculous laryngitis, if undisturbed, shows a marked tendency towards spontaneous recovery. Ordinarily, however, it is continuously reinfected by the virulent bacilli of the sputum. A pneumothorax, in so far as it leads to a cessation of sputum production, might readily further the healing of the laryngitis.

Rénon, so far from considering acute phthisis a contraindication, states that he has repeatedly seen a favorable influence exerted upon this condition by an artificial pneumothorax. His observations, at present, lack confirmation.

The beneficial influence of the procedure upon intractable hemoptysis has been observed by many clinicians and from the nature of the process we should expect this to be the case. A certain knowledge of the side, whence the hemorrhage is coming, is obviously indispensable. An error in this respect would only make matters worse.

Good results have been reported, following the indication of artificial pneumothorax, in abscess of the lung, bronchiectasis and purulent bronchitis. Here, too, the collapse of the pulmonary tissue leads to an obliteration of the abscess cavity and so to a cure of the pathological process.

In this connection an interesting observation of Wenckebach deserves mention. He found that chronic tuberculous empyema was favorably influenced by being converted into a pyopneumothorax. After aspirating the pus, air was allowed to enter the pleural cavity. This was done repeatedly and resulted in the cure of the empyema in 2 cases, and improvement in the third. Chronic tuberculous empyema is notoriously intractable to surgical interference, so that Wenckebach's method deserves a trial. It is obviously not indicated in acute empyema.

TECHNIQUE.

Artificial Pneumothorax.—The production of an artificial pneumothorax consists in the introduction into the pleural cavity of an innocuous substance, in quantities sufficient to produce a collapse of the diseased lung. The latter, then, no longer takes part in respiration, but is compressed to such an extent that any cavities that may be present are obliterated and their walls given an opportunity to grow together. The only substance that has been successfully injected into the pleural space for this purpose is nitrogen gas. Air or oxygen is absorbed by the pleural surfaces so rapidly as to render them useless for this purpose. Physiological salt solution, sterile oil, liquid paraffine, and other fluids have been tried, but give rise to severe local or general reactions.

The nitrogen is most conveniently obtained in tanks, from a dealer.

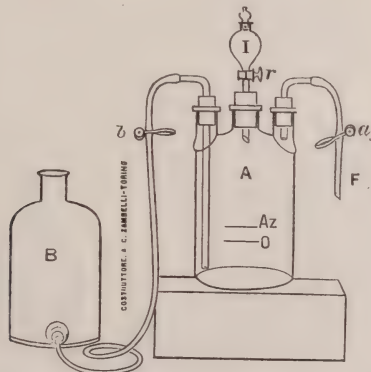


Fig. 1.—Apparatus for converting atmospheric air into pure nitrogen. A Wolff bottle (A), with three necks, and holding 4 litres, is connected as in the diagram and provided with two marks. The first (O) is at the level of one litre, the second (Az) at the level of 1,600 c.cm. The other bottle (B) also contains 4 litres and is filled with water; the separating funnel (I) contains 50 c.cm. of a 20 per cent. solution of potassium hydrate. A 20 per cent. solution of pyrogallic acid is introduced into bottle A, up to the mark O. The contents of I are then allowed to flow into A, stop-cocks *r* and *a* are shut, but cock *b* between the two bottles remains open. After the lapse of twenty-four to thirty-six hours, all of the oxygen and carbonic acid gas in A will have been absorbed and a corresponding amount of water will have been drawn in from B. When the level of the fluid in A has reached the mark Az, the reaction may be considered complete. The nitrogen may then be forced into the injection apparatus by raising the bottle B.

Where it cannot so be obtained, it can easily be derived from the atmospheric air by means of a simple apparatus (Fig. 1). Into a large bottle, a sufficient amount first of pyrogallic acid and then of potassium hydrate solution is introduced. The oxygen is nearly completely absorbed and the residue may be used for injection. As nitrogen itself is slowly absorbed by the pleural surfaces, repeated injections are requisite to maintain a pneumothorax of sufficient volume. Fortunately, the pleura seems gradually to lose its power of absorbing nitrogen, so that after a while the injections need to be repeated only at long intervals.

There is but little difference of opinion regarding the technique of subsequent injections. As regards the best manner of performing the first injection, however, clinicians may be divided into two schools: those who follow the method of Forlanini and those who follow that of Murphy.

Forlanini uses a rather fine aspirating needle, 0.4 to 1.2 mm. in diameter and 3-5 cm. in length. A small olivary circlet glides along the needle and may be fixed at any desired point by means of a screw. This prevents the needle from slipping in too far if the patient makes a sudden movement. A variety of other needles have been recommended. Schmidt uses a short, sharp needle, with a wide bore. This is thrust through skin and intercostal muscle, but is not long enough to reach the pleura. A slender blunt needle, with an eye just to one side of the tip, is inserted into the lumen of the first needle and pushed through the parietal pleura. Its blunt tip is less apt to injure the visceral pleura than the sharp points of Forlanini's needles.

The cannula, employed by Deneke, occupies a position intermediate between these two. It has a lateral window and is closed at the point.

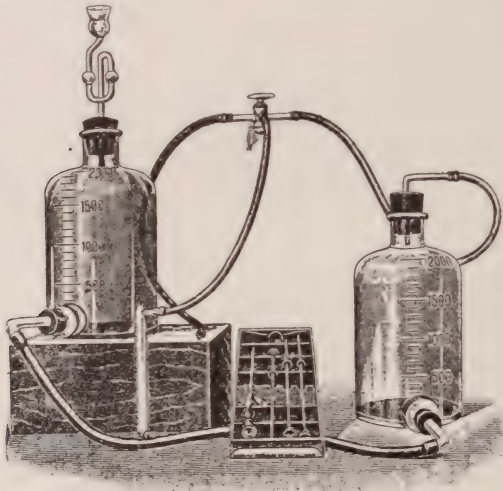


Fig. 2.—Brauer's Apparatus. The bottle to the left contains the fluid furnishing the pressure, that to the right the nitrogen. The needle is attached to the free end of the tube, resting on the wooden block. A three-way cock enables the needle to be connected, at will, either with the gas bottle or with the small mercury manometer leaning against the wooden block. The apparatus could be improved by two modifications. The mercury manometer may be replaced by a bulkier but much more sensitive water-manometer, and the glass three-way cock by a smaller metal one near the needle. Needle and cock could then be manipulated by the operator, making him less dependent upon his assistant.

It is semi-blunt, having a cutting rather than a puncturing point, and is thrust into the pleural cavity through a small incision previously made in the skin. A great variety of other needles have been described, nearly every author advocating some modification of his own; for these, the reader must be referred to the original articles.

The danger inherent in the puncture method of producing artificial pneumothorax lies in the possibility that the needle may enter a vein and gas-embolism result. A number of fatalities have occurred during the operation that may be ascribed to this accident. The danger of this complication may be almost entirely obviated by the procedure of Murphy and Brauer. Under local anesthesia, an incision is made, at a suitable spot, down to the parietal pleura. A blunt cannula with a lateral opening is then

thrust through the latter. The end of the cannula can then be felt or even seen lying under the thin parietal pleura, in the pleural cavity. Nitrogen may now be introduced and, as the surgeon is seeing just what he is doing, the risk of injecting gas into a vein is entirely avoided. It is obvious that each method has its advantages. The former is simple for the patient in that it represents much less of an operation and may readily be done, either at the physician's office or the patient's home. Moreover, if carefully and skilfully done, it is nearly free from danger. The cutting method, on the other hand, entirely eliminates the chief danger connected with the treatment and requires less care and skill on the part of the operator. A considerable number of men have abandoned the cutting for the puncturing method, admitting, however, that the lessons learnt from

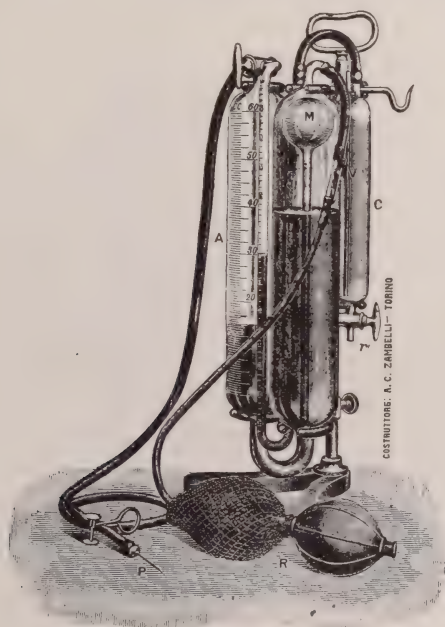


Fig. 3.—Forlanini's Apparatus. The burette A contains the gas; that marked B, the fluid which furnishes the pressure. The latter may be supplemented by means of rubber bellows. Between the two containers hangs the water-manometer. The apparatus is made by A. C. Zambelli, of Turin, and P. A. Stoss, Nachf., Wiesbaden.

the former have taught them how to use the latter, and that, at any rate for a beginner, the cutting method is the safer.

Deneke endeavors to avoid the risk of gas-embolism in still another manner. Having thrust the needle into the pleural cavity, he first injects some pure oxygen gas. When the behavior of the manometer, as will be described below, has shown the oxygen to be flowing freely into the pleural cavity, nitrogen is injected instead. Since the injection of oxygen into a vein is ordinarily not followed by ill results on account of the rapid absorption of the oxygen by the hemoglobin, the danger of gas-embolism with Deneke's method, is hardly greater than with that of Murphy and Brauer. Nevertheless, Deneke's method is not apparently being widely used.

The injection apparatus is simple in principles, although the number of individual modifications is very large. It consists essentially of two bottles and a mercury manometer, connected as in Fig. 2, and separated from each other by means of stop- or pinch-cocks. The second bottle is filled with nitrogen which is forced into the pleural cavity by the pressure furnished by the fluid (usually 1:1000 bichloride) in the first bottle. A manometer to measure the intrathoracic pressure is an indispensable adjunct.

Forlanini's apparatus, in its latest modification, is a neat and portable apparatus (Fig. 3). It is nearly entirely of glass; instead of having the two containers movable with reference to each other, additional pressure, if needed, is furnished by a pair of rubber bulbs. Deneke's apparatus (Fig. 4) is somewhat clumsier on account of the duplication due to the

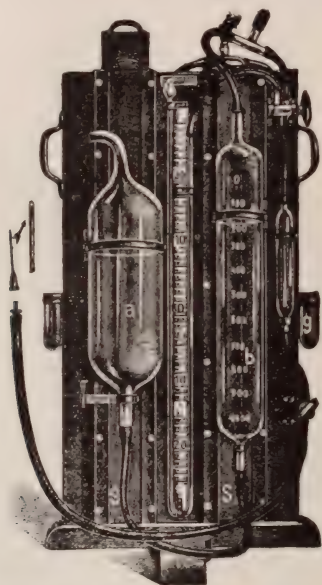


Fig. 4.—Deneke's Apparatus. The bulb *a* contains the gas, the burette *b* the fluid that furnishes the pressure. Between the two hangs the water-manometer. The burette *b* can be moved up and down, thus altering the pressure in *a*. A duplicate of this apparatus is mounted on the other side of the stand, one set being used for oxygen, the other for nitrogen. The apparatus is made by P. A. Stoss, Nachf., Wiesbaden.

presence of an oxygen as well as a nitrogen container. Its weight, however, is not great. A neat form is that devised by Robinson (Fig. 5) which combines portability and simplicity. A simple arrangement, such as can be devised by any physician, will, however, serve the purpose.

The one indispensable feature of every such apparatus is the water-manometer and disaster can be avoided only if every insufflation is performed strictly according to the indications furnished by the manometer. If the needle lies free in the pleural cavity, the manometer will show a negative pressure, increasing in negativity with inspiration and decreasing with expiration. Ordinarily both inspiratory and expiratory pressures are negative, but even if the expiratory pressure is positive, the mean pressure must be negative. These respiratory changes in pressure and their nega-

tive character are indispensable prerequisites for the production of an artificial pneumothorax. In their absence, the operator has no assurance that he is in the pleural cavity. The eye of the needle may lie in the chest wall, in a pleural adhesion, in an encapsulated space, within the pulmonary tissue, in a bronchus, or a cavity, or even within the lumen of a blood-vessel. Under these circumstances the introduction of nitrogen gas may result in accidents ranging in gravity from a pleural emphysema to a fatal embolism. Under these circumstances, Deneke injects a small amount of oxygen. If the trouble is due to an obstruction of the needle by the pleura lying against its eye or by a comparatively fragile adhesion, this injection may free the needle and make the manometer show the typical negative pressure fluctuations. Other operators sometimes inject a few c.cm. of nitrogen under these circumstances in the hope that the needle will be freed, but this is unquestionably a dangerous procedure.

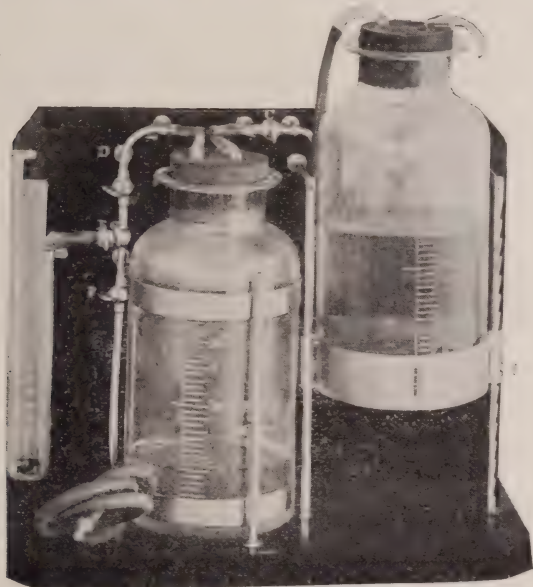


Fig. 5.—Robinson's pneumothorax apparatus. The pressure bottle, on the right, is held at any desired elevation by a ratchet. The stop-cocks C, D, E and F replace the pinch-cocks of Fig. 1.

If manipulating the needle does not sooner or later lead the manometer to register the proper respiratory pressure-fluctuations, it is better to withdraw the needle and try a different site.

As regards the site of injection, no specific directions can be given. By means of careful physical examination, combined with radioscopy, the portion of the lung least affected can be determined. This site will usually be chosen, since we may reasonably expect to find the fewest adhesions there. Practically, this will by no means always be the case, and often enough several punctures will be required before a suitable spot is found.

The amount to be injected will vary according to the behavior of the manometer and, to a considerable extent, to the methods of the operator. Forlanini makes his first injection very small, rarely using more than 400

c.cm. of nitrogen, but repeating the injection every day or two until complete collapse has been obtained. Other operators inject several times as much and so are compelled to reinject less frequently. In general, the injection should not be continued after the inspiratory pressure has become positive, nor after the patient has begun to complain of any considerable discomfort. Sometimes in the presence of comparatively fragile adhesions, the latter may be compelled to give way. After the injection of a small amount of gas, the patient complains of pain and the respiratory pressure becomes positive. This is due to the fact that the eye of the needle lies in an encapsulated pleural space which has become distended with the gas. Instead of withdrawing the needle, the operator shuts off the nitrogen and waits. After the lapse of a few minutes, the inspiratory pressure may again become negative on account of the separation of the adhesions. More gas may then be injected and this procedure may be repeated at intervals until, with patience, a satisfactory amount has been injected.

The intervals at which reinjections become necessary also depend upon circumstances. Physical and, still better, radioscopic examinations furnish some notion as to the rapidity with which the pneumothorax is being absorbed. In general, the greater the amount of gas injected, the longer the interval will be, varying at first from twenty-four hours to a week and, later in the treatment, from a fortnight to several months. The amount to be reinjected will depend upon the respiratory pressure, sufficient being usually injected to convert the negative inspiratory pressure into a feebly positive one.

Whether a case will admit of the induction of an artificial pneumothorax cannot always be determined in advance. In general, the less dense and numerous the pleuritic adhesions, the better the prospect of a successful pneumothorax. To a certain extent, information may be obtained on this point by means of radioscopic or radiographic examination. A still better method consists in the careful percussion of the lower limit of pulmonary resonance during extreme inspiration and expiration. The greater the respiratory variation of the lower limit of pulmonary resonance, the less trouble we may reasonably expect from adhesions.

Extrapleural Thoracotomy.—It is clear that an artificial pneumothorax can be produced only when there are no extensive adhesions between the pleural surfaces. This, however, will often be the case and especially in just those cases of extensive cavity formation in which we most desire to bring about pulmonic collapse. This consideration induced Brauer to suggest for such cases the partial or total removal of the ribs on the affected side. Deprived of its bony support, that side of the chest must collapse and lead to a compression of the lung, quite as complete as with a pneumothorax. The labors of Brauer, Spengler, Friedrich, Sauerbruch, Wilms and others, have led to the development of an operation, for the details of which the reader must be referred to the original communications. The indications for the operation are those that apply to the production of an artificial pneumothorax, with the coexistence of extensive pleuritic adhesions. The operation, which must be modified to suit each individual case, consists in the removal of a considerable portion of a large number of ribs on the affected side. It is of the greatest importance to remove the lower ribs and the paravertebral portions, the removal of the upper ribs or of the sternal portion of the lower ones not leading to a satisfactory pulmonic collapse. Sauerbruch usually removes portions of the second to the tenth or eleventh ribs, inclusive, 4-6 cm. of the upper

and 8-10 cm. of the lower ribs. Wilms goes even further and usually resects also the first rib and the clavicle.

Obviously such an operation makes great demands upon the vitality of the patient, and should be performed at one sitting, in only a small proportion of the cases. If done in two or more sittings, at suitable intervals, the patients usually bear the operations well. The latter should be done under local anesthesia, rarely with the aid of a very superficial chloroform narcosis. The results, as will be pointed out later, have been very satisfactory.

Phrenicotomy.—The diseased lung may be immobilized in still a third way. It has long been known that, in cases of unilateral paralysis of the diaphragm, the affected half of the latter moves upward until it reaches the position of extreme expiration and thereafter remains practically motionless. The corresponding abdominal viscera follow the diaphragm into the thorax, so that a compression of the lung results on that side, nearly as complete as in cases of artificial pneumothorax. This consideration led Stuerz to suggest section of one phrenic nerve for cases in which a thoracoplasty would otherwise be considered, and one case, operated for him by Bardenheuer, had a satisfactory outcome. Sauerbruch, to whom we owe much of our knowledge of thoracoplasty, has done a phrenicotomy in 5 cases, twice without and three times with a partial thoracoplasty. All five patients have shown definite improvement, although the interval since the performance of the operation is too short to permit any final judgment. He believes that the chief value of phrenicotomy in pulmonary tuberculosis will turn out to be that it will permit a partial instead of an extensive thoracoplasty, with the same ultimate effect upon the diseased lung. The technique of the operation is very simple, and will be found described in Sauerbruch's article.

RESULTS.

The cases of artificial pneumothorax reported statistically, or in some detail, now amount to about a thousand. The immediate results are almost always good. The fever is almost always favorably affected. Sometimes each injection is followed by a temporary rise in temperature, sometimes by a temporary fall. Usually, however, the fever slowly declines, ultimately, after the lapse of a number of weeks, to cease. The more complete the pneumothorax and the less the involvement of the other lung, the more rapid and complete the cessation of the fever. Such patients, however, remain in a condition of thermal instability and respond to slight intercurrent infections with an undue rise of temperature.

The increase in weight is less constant and many patients, who are apparently doing well, at first show little or no change in this respect. Ultimately, however, if the pneumothorax is leading to a favorable outcome, the gain in weight is steady and considerable. The patient and the physician must not be disappointed if any change for the better, in this respect, is slow and delayed.

The night-sweats and the digestive troubles usually cease promptly, if the pneumothorax is complete, and the patients nearly uniformly report an increased feeling of well-being. This is doubtless to be ascribed to the cessation of absorption of toxic products from the collapsed lungs.

One of the most uniform results following the production of a pneumothorax is the diminution of the amount of sputum. Often, each injection of gas is followed by a temporary increase due, doubtless, to the partial

emptying of the still further compressed cavities. The tubercle bacilli, in the sputum, persist for a long time and their ultimate disappearance may always be interpreted as a good omen, prognostically.

Whatever may be said *a priori* against the induction of an artificial pneumothorax in severe and intractable hemoptysis, the cases hitherto reported have shown uniformly favorable results, the hemorrhage ceasing only at once. Piéry and Le Bourdellès state that two of their pneumothorax cases succumbed to pulmonary hemorrhage. In neither case, however, was the compression of the diseased lung complete and it is possible that the bleeding was from the other lung.

The nature of the case makes a statistical summary of the final results not only difficult, but in many respects misleading. The patients, subjected to the treatment, are nearly all cases of advanced pulmonary tuberculosis, most of them doomed under ordinary methods of treatment, so that a large mortality is inevitable. Moreover, while some patients do well for a number of years and then fail rapidly, others behave unsatisfactorily for some time before improvement sets in. For this reason, Forlanini declines to tabulate his 163 cases statistically, preferring to state that, on the whole, artificial pneumothorax is a satisfactory treatment and that it results in a considerable number of triumphant recoveries in cases of advanced tuberculosis, formerly considered hopeless.

Nearly 1,000 cases of artificial pneumothorax have been reported, with a symptomatic cure of 40 per cent. Brauer and Spengler tabulate their large material as follows, as regards ultimate results: Very good, 45 per cent.; good, 17 per cent.; satisfactory, 15 per cent.; unsatisfactory, 15 per cent.; dead, 7 per cent. By 'very good' they mean a symptomatic recovery, with complete cessation of fever, either no sputum or a scanty one free from tubercle bacilli, a satisfactory gain in weight, and the ability to do a normal amount of work.

Robinson and Floyd report 6 cases arrested out of 28 treated and Burnaud 5 out of 28. In one of the large Berlin clinics, however, out of 40 cases so treated, within the past three years, only one complete recovery has been observed; still, the results in general, though not ripe for publication, are considered very favorable.*

In a word, although there may be differences of opinion regarding details, it is clear that this treatment greatly improves the outlook for the advanced consumptive.

The results in extrapleural thoracoplasty are naturally not quite so good, and yet, if the published reports are to be trusted, are astonishingly favorable. We must remember that the cases are chiefly patients in whom a pneumothorax could not be done on account of extensive adhesions. Friedrich had reported 9 deaths out of 27 cases operated. As the result of improved technique and more careful selection of cases, Sauerbruch was able to report a series of 41 cases with 20 per cent. of complete arrest of the disease, 50 per cent. improved, and only 2 per cent. immediate and 15 per cent. total mortality. Even if we look upon these statistics as not very sanguine, we must concede that they thoroughly justify the operation in this dismal condition.

Unilateral phrenicotomy is too recent an operation to admit a final judgment regarding its value. Sauerbruch, however, expresses himself very favorably regarding its effects, especially when combined with a partial thoracoplasty.

*Personal communication.

SUMMARY.

1. The ideal indication for the production of an artificial pneumothorax is an advanced, unilateral pulmonary tuberculosis without extreme pleural adhesions. The indication may be extended to cover even comparatively early cases, if the disease is progressive and not yielding to treatment. Moderate involvement of the other lung does not contraindicate the procedure, but makes the outcome more dubious. The same is true if other viscera are involved.

2. By means of successive injections of nitrogen the lung must be maintained in a completely collapsed condition for a period of time varying from one to several years.

3. The first injection of nitrogen may be done by means either of puncture or incision. The former is more pleasant for the patient, but involves the risk of injury to the lung and of gas-embolism. The latter is more of an operation, but is safer. The puncture method is justified only in cautious, expert hands. The subsequent injections are always done by means of puncture. In all injections, disaster can be avoided only if the gas is introduced under the constant control of a water-manometer. The latter must show a negative pressure, with increasing negativity on deep inspiration.

4. Where extensive pleural adhesions prevent the production of an artificial pneumothorax, the operation of extrapleural thoracoplasty may be substituted. Its indications are otherwise the same as for artificial pneumothorax. The operation must be extensive to be of value.

5. Phrenicotomy may eventually complement thoracoplasty, being a simple procedure, that may permit of adequate lung collapse, with a very much less radical rib removal.

6. The results of artificial pneumothorax are much more favorable than those of any other method of treating advanced pulmonary tuberculosis. Those of thoracoplasty, as reported, amply justify the operation in suitable cases.

THE RÔLE OF THE THYMUS IN EXOPHTHALMIC GOITRE.

A REVIEW OF RECENT LITERATURE.

By M. G. SEELIG, M. D., of the Editorial Staff.

1. Von Basedow: Concerning Exophthalmos. (*Casper's Wochenschr.* No. 49, p. 769, 1848.)
2. Von Beck (Congress of German Naturalists. *Zentral. fuer Chir.*, No. 47, p. 1539, 1911.)
3. Bircher (*Zentralbl. fuer Chir.*, No. 5, 1912).
4. Capelle (*Beitr. zur klin. Chir.*, Bd. 58, Hft. 2).
5. Cunningham: Administration of Thymus in Exophthalmic Goitre. (*Medical Record*, Vol. XLVII, No. 24.)
6. Charcot: Tuesday Lectures. 1888.
7. Cooper: The Anatomy of the Thymus Gland. London. 1832.
8. Delore: Surgical Treatment of Exophthalmic Goitre. (*Rapport au XXIII Congrès de Chir. de Paris*, p. 23, 1910.)
9. Garré: Thymectomy in Basedow's Disease. (*Verhandl. der Deutsch. Gesellsch. fuer Chir.*, Vol. I, p. 43, 1911.)
10. Gebele: Persistent Thymus in Basedow's Disease. (*Beitr. zur klin. Chir.*, Bd. 70, p. 20, 1910.)
11. Gluck: Persistent Thymus in Hyperplastic Struma. (*Berl. klin. Wochenschr.*, No. 12, p. 670, 1894.)
12. Graves: System of Clinical Medicine, p. 674. Dublin. 1843.
13. Von Haberer: Thymectomy in Graves' Disease. (Report of German Surgical Congress, 1913. (*Journ. Amer. Med. Assoc.*, p. 1474, May 10th, 1913.)
14. Von Hanseemann: Thyroid Gland and the Thymus. (*Berl. klin. Wochenschr.*, No. 44, p. 65, 1905.)
15. Mackenzie: Graves' Disease with Persistent Thymus. (*Lancet*, Vol. I, p. 380, 1897.)
16. Markham: Affection of the Heart with Enlarged Thyroid, Thymus and Prominence of the Eyes. (*Med. Times and Gazette*, p. 464, 1858.)
17. Marine and Lenhart: Relation of Iodine to the Structure of the Human Thyroid. (*Archives Int. Med.*, November, 1909.)
18. Melchior: The Relation of the Thymus to Basedow's Disease. (*Zentralbl. fuer die Grenzgeb. der Med. und Chir.*, No. 3, p. 166, 1912.
19. Mikulicz: The Feeding of the Thymus in Goitre and Basedow's Disease. (*Berl. klin. Wochenschr.*, No. 16, p. 342, 1895.)
20. Moebius: Die Basedowsche Krankheit. Vienna. 1906.
21. Owen: Further Notes on the Treatment of a Case of Exophthalmic Goitre. (*British Med. Journ.*, Vol. 2, p. 361, 1895.)
22. Pallauf: The Relation of the Thymus to Sudden Death. (*Wien. klin. Wochenschr.*, No. 46, 1889, and No. 9, 1890.)

23. Rehn: Surgical Treatment of Basedow's Disease. (*Mitteil. aus dem Grenzgeb. der Med. und Chir.*, Bd. 7, p. 165, 1901.)
24. Schnitzler (*Wien. klin. Wochenschr.*, No. 20, p. 371, 1894).
25. Spencer: Exophthalmic Goitre Causing Death by Asphyxia. (*British Med. Journ.*, Vol. I, p. 521, 1891.)
26. Spisharny: Contraindication to the Operative Treatment of Basedow's Disease. (*Zentralbl. fuer Chir.*, No. 35, p. 1204, 1907.)
27. Thorbecke: Basedow's Disease and Persistent Thymus. (Inaugural Dissertation, Heidelberg, 1905.)
28. Tillmanns: Lehrbuch der Speciellen Chirurgie. Bd. 2, Th. I, p. 504, 1899.
29. Todd: A Case of Exophthalmic Goitre Treated by Thymus Gland. (*British Med. Journ.*, July 25th, 1896.)
30. White: Prognosis of Exophthalmic Goitre. (*British Med. Journ.*, Vol. 2, p. 151, 1886.)

The one fact, and probably the only one, in relation to exophthalmic goitre, concerning which there is unanimity of opinion, is that the disease depends upon an anomaly in the internal secretory mechanism. Definite confirmatory evidence cannot be furnished, either in sufficient quantity or of sufficient weight to establish definitely the contention of Marine in favor of hypothyroidism, or that of Kocher and his school in favor of hyperthyroidism. The significant fact in regard to exophthalmic goitre is that it is probably the only disease of the internal secretory organs which is accompanied almost constantly by a visible and palpable enlargement of the organ supposedly disturbed—the thyroid gland. In surgery, the idea of tumor formation has always been correlated with the idea of excision; it was a natural step therefore to proceed to excise portions of hyperplastic thyroids in the course of Graves' disease, as an empirical therapeutic procedure. The result of the institution of surgical treatment has been the undoubted cure of innumerable exophthalmic goitre patients, and also the establishment of hemithyroidectomy and thyroid artery ligation on ground so firm that the doctrine of hyperthyroidism, as the essential factor in exophthalmic goitre, has become well established.

That the establishment of the doctrine of hyperthyroidism is not for all time secure, depends upon two factors: (1) conflicting experimental data, and (2) conflicting clinical data. For example, Marine deduces, from his experimental chemico-pathological studies, that thyroid enlargement is only one manifestation of a general disturbance of metabolism, and that, as a rule, in spite of thyroid hyperplasia, there is lowered thyroid function. This work of Marine called forth a critique from Kocher, who, very largely on a clinical basis, attempted to controvert Marine's conclusions. The conflict of clinical data is mirrored by the facts that seemingly similar grades of exophthalmic goitre respond very differently to operative treatment, that many internists and neurologists still assert a preference for non-operative forms of treatment, that excellent results have been reported following extrathyroid operations (operations on the nose, and on the genitalia, for example), and, finally, by the fact that the thyroid is an extraordinarily well-vascularized organ, possessing a widely extensive collateral path, thus rendering it difficult to establish a direct causal relationship between the ligation of one superior thyroid artery and the amelioration of symptoms which ensues.

In the face of such conflicting experimental and clinical evidence, it is not difficult to understand why there should exist to-day a variance of opinion regarding exophthalmic goitre—a variance of opinion as pronounced, though possibly not as emphatically expressed, as in earlier days when Graves argued for a form of hysteria, Basedow for a dyscrasia, and Charcot for a neurosis. Nor is it difficult to understand attempts to divert attention from the thyroid, and, if possible, to link the symptoms of exophthalmic goitre with anomalous activity of one of the other internal secretory organs. The internal secretory organ most actively discussed just now is the thymus; and the discussion has centered largely around the thymus as a result of the work and publications of Capelle.

Capelle noted that many patients with exophthalmic goitre, who died immediately after or during operation, showed at autopsy an enlarged thymus, and a hyperplasia of the lymphatic system. These findings naturally suggested to him a relationship between exophthalmic goitre and status lymphaticus as described by Paltauf. In describing status lymphaticus, Paltauf called attention to the enlarged thymus and hyperplastic lymphatic system, but did not state that the enlarged thymus itself was the cause of so-called thymus death; he inclined rather to consider status lymphaticus as a constitutional metabolic disturbance. Capelle, however, was led to concentrate practically his entire attention upon the thymus, to regard it as an index of the severity of exophthalmic goitre, and to enunciate the doctrine that if physical and roentgenological findings disclosed an enlarged thymus, operative interference for the cure of exophthalmic goitre was *ipso facto* contradicted. Capelle was sustained in his position by the French surgeon Delore, and by the Russian, Spisharny.

Following the enunciation of Capelle's views regarding the rôle of the enlarged thymus, we see demonstrated again the surgical association of ideas mentioned above—namely, hyperplasia and excision. In 1910 Garré excised an enlarged persistent thymus in a patient suffering with exophthalmic goitre.

The combined publications of Capelle and Garré have given a forcible impetus to the doctrine that the thymus plays an important part in the etiology of exophthalmic goitre; but it must not be inferred from this that the hypothesis is an entirely new one. In 1895, Owen, by mistake, fed a goitre patient thymus instead of thyroid, and noted marked improvement. About the same time, Cunningham, Todd, and others reported similar experiences, and in 1895 Mikulicz reported a cure apparently complete except in that the size of the goitre was not much influenced. Melchior, in an excellent critical review, traces back to 1858 the attempt to correlate exophthalmic goitre with hyperplasia of the thymus. Markham, in 1858, followed later by White, Spencer, Mœbius, Marie and others, emphasized the coexistence of hyperplastic thymus with exophthalmic goitre. Mackenzie, in 1897, announced that an enlarged thymus was a constant accompaniment of exophthalmic goitre. Schnitzler, in 1894, was the first to attach specific clinical importance to the combined thyroid and thymus enlargement, and his contention was supported by Tillmanns, who stated that, in setting an operative indication for Graves' disease, one must determine the existence of an enlarged thymus, which causes lowered resistance and predisposes to sudden death. Following Schnitzler and Tillmanns, Thorbecke supported the same doctrine, and then finally came the paper of Capelle,

already mentioned, furnishing statistical evidence to the effect that 100 per cent. of all cases of exophthalmic goitre that died during or immediately after operation showed an enlarged thymus. Rehn, Schultze, von Beck and Gebele confirm the fact that hyperplastic thymus glands are found in a strikingly large percentage of those cases of exophthalmic goitre that die following operation. This question is, of course, complicated by the fact that these deaths resemble very closely the so-called thymus death—a type of *exitus letalis* which is not clearly understood, and, furthermore, by the fact that these exophthalmic goitre patients usually possess a seriously damaged cardiovascular apparatus. But by far the most puzzling fact to cudgel one's brain over is the statement of Melchior that although an enlarged thymus accompanies simple goitre, just as it does the exophthalmic variety, sudden death practically never follows the enucleation of a simple hypertrophied thyroid. Cooper, Gluck, Virchow and Hanseemann all confirm the coexistence of simple goitre and hyperplastic thymus.

Further complexity is caused by the facts that according to some authors the thymus is stated to be a lymphatic organ, whereas by others it is assumed to be an epithelial organ; by some the medullary portion and cortical portion is supposed to possess separate functions; and some authors report that thymus feeding lessens the severity of exophthalmic goitre, while others report that it exaggerates the symptoms. Many of these moot points will be cleared up after some of the more recent experimental work has stood the test of confirmation. For example, Bircher, less than a year ago, reported the production of typical symptoms of exophthalmic goitre in young dogs, by injecting into them the juice of the thymus removed from a patient suffering with Graves' disease. Such experimental proof would, of course, be very conclusive were it confirmed. As a matter of fact, however, Gebele claims to have been unable to confirm Bircher's conclusions.

Unfortunately we cannot call to our aid any clinical deductions, for up to the present time thymectomy has not been performed a sufficient number of times to enable us to draw definite conclusions. Garré's case has been attacked on the ground that, in the first place, not a cure, but an improvement only followed thymectomy, and, secondly, on the ground that the thymectomy had been preceded by a partial thyroidectomy. At the recent German Surgical Congress, held only two months ago, von Haberer reported 5 cases of thymectomy for Graves' disease, with excellent postoperative results. One patient, who had undergone a previous hemithyroidectomy with ligation of the superior thyroid artery, and who showed progressive symptoms of the disease despite this operation, was restored to such perfect health by thymectomy that he was able to perform feats in mountain climbing. Such a report as von Haberer's is attractive, and it would be compelling in its force, were it not for the fact that similar results to those attained by von Haberer have been secured, ostensibly at least, by various lines of medical treatment, by rest cures, by intranasal operations, and by operations on the genitalia in women.

It seems almost impossible to avoid the conclusion that if there really be a close relation between exophthalmic goitre and hyperplastic thymus, no one has yet demonstrated the why and wherefore of the relationship. It is assumed by some authors that there exists in the thyroid internal secretion a substance that inhibits an element of toxicity in the thymus secretion, and that when a hemithyroidectomy is performed, the thyroid

is no longer able to furnish a sufficiency of this neutralizer. As a result, the organism is poisoned by an excess of the unneutralized toxins from the thymus. It is not clear why the thyroid inhibits thymic toxicity. Indeed, the entire hypothesis of interrelated augmentor and inhibitory activities, on the part of the various glands of internal secretion, rests on anything but a stable basis. It is contended rather forcibly by some authors, for example, that the thymus and thyroid, instead of having antagonistic functions, support each other in their functions. It may be hoped that the present activity of surgeons and laboratory experimenters along the lines of thyroid and thymus interrelationship will furnish valuable data.

In conclusion it is interesting to note the deductions that Melchior makes as the result of his survey of the literature: "The practical results of the contributors to literature may be summarized as follow: In florid Basedow, an enlarged thymus (as a rule, a manifestation of status lymphaticus) occurs in from 80-90 per cent. of the cases in which operation was followed by death. There is no statistical evidence on which to base the statement that the existence of an enlarged thymus contra-indicates thyroidectomy for Basedow's disease. Furthermore, there is no proof that an enlarged thymus adds an independent source of toxic danger in cases of Basedow. It is impossible to ascertain whether the enlarged thymus is a congenital or an acquired condition; but it cannot be denied that the status thymico-lymphaticus may be a general tissue reaction brought about by hyperthyroidism. It may be possible, therefore, that a primary hyperplastic thymus may share secondarily in the general atrophy that occurs as the result of a Basedow cachexia."

DIAGNOSTIC POINTS IN ACQUIRED HEART DISEASE IN CHILDHOOD.

A REVIEW OF RECENT LITERATURE.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Schlieps: Heart Sounds in Infancy. (*Monatsschr. fuer Kinderheilk.*, Vol. X, No. 9.)
2. Friberger: Arrhythmia in Healthy Children. (*Jahrbuch fuer Kinderheilk.*, Vol. 58, p. 30.)
3. Tanaka: Heart Muscle in Diphtheria. (*Virchow's Archiv*, Bd. 297, 1912.)
4. Rohmer: Investigations of Heart in Diphtheria. (*Jahrbuch fuer Kinderheilk.*, Vol. 67, p. 391, 1912.)
5. Mackenzie: The Heart in Childhood. (*Proc. Royal Society Med.*, Vol. VI, p. 66, 1913.)
6. Turnbull: Cardiac Irregularities in Childhood. (*Australas. Med. Journ.*, April 20th, 1912.)
7. Pisek and Coffin: The Polygraph as an Aid to Diagnosis of Cardiac Conditions in Children. (*Amer. Journ. Dis. Children*, February, 1912.)
8. Landis and Kaufman: Venous Hums in Children. (*Archives Pediat.*, February, 1912.)
9. Hecht: Differentiation of Functional and Organic Heart-block. (*Zeitschr. fuer Kinderheilk.*, October 5th, 1912.)
10. Hamburger: Rigidity of Arteries in Childhood. (*Muench. med. Wochenschr.*, January, 1912.)
11. Hoobler: Blood-Pressure Readings in Childhood. (*Amer. Journ. Dis. Children*, July, 1912.)
12. Leitao: Blood Pressure in Infancy. (*Abs. Archives Pediat.*, March, 1913.)

It is well known that in infants with severe nutritional disturbances, the heart sounds become much weaker until finally only one sound can be heard. There has been much discussion as to whether this remaining sound is the first or the second sound. The question is of more than academic importance, because a rational therapy must needs concern itself with the decision. If it be the first sound which disappears, it is advisable to take measures to increase the contractile power of the heart. If it be the second, the therapy will concern itself with the blood-pressure.

As a result of his studies of the literature and of his personal investigations, Schlieps believes that in these cases it is the first (muscular) heart sound which disappears. His reasons for this conclusion are as follow:—

We know that during the acute infectious diseases in severe form in older children, it is the first sound which disappears.

The atonic condition of the skeletal musculature would suggest a diminished tone of the heart muscle.

The diminution in clearness of the heart sound, with normal blood pressure, would indicate that it is the first heart sound which grows fainter.

The remaining sound is more distinct over the pulmonary area than at the apex.

Exhibition of cardiants (*c. g.*, camphor) make the sounds clearer even where the blood-pressure is normal.

In a study of arrhythmia in healthy children, Friberger made careful examination of three hundred and twenty-one children from five to fourteen years of age. The previous history was thoroughly investigated and complete physical examination made in each instance.

A perfectly regular pulse was present in *none* of the children. Differences of 0.2-0.3 second in the pulse were present in 64.9 per cent., while some of the children showed variations as high as 0.6-0.7 second. The author divided his cases into three groups:—

- (a) Cases with slight arrhythmia, 37.4 per cent.
- (b) Cases with mild arrhythmia, 50.4 per cent.
- (c) Cases with severe arrhythmia, 12.2 per cent.

In most of the cases there was an alternation of long and short pulse. Often the pulse-beats progressively increased for a number of beats and then decreased. Another type showed sudden retardation at regular intervals followed by gradual increase in rapidity. There is an evident relation of the arrhythmia to the respiratory variations as seen in children. The arrhythmia seemed to arise at the sinus. Auricular extrasystole was seen, but real ventricular extrasystole and auriculo-ventricular heart-block were not encountered. Differences in amplitude of the pulse were not as marked as the time differences. The author holds that children otherwise healthy and having normal respiration and digestion have no heart lesion even when irregularity is observed in the pulse. Psychic disturbance may account for the irregularity in nervous children. It often occurs, however, in children convalescent from acute infections and may then be due to true heart weakness.

Within the past few years various observers have concerned themselves with the pathological histology of the heart muscle after the acute infections, especially diphtheria. Two studies of importance in this connection have been published recently. Tanaka examined the hearts of fifteen children dying as the result of diphtheria. He found that the acute cardiac weakness was due to myocardial degeneration without special involvement of the auriculo-ventricular bundle. It would appear that change in the His bundle can rarely be regarded as the direct cause of death. These changes consist in fatty degeneration, waxy-like degeneration of the muscle fibres with loss of cross striations and partial or complete loss of nuclear staining. Rohmer has made special studies of the heart in children with diphtheria. His clinical studies were enforced by observations with the electrocardiograph. His clinical studies of heart-block appearing several days before death were supplemented by anatomical studies. He found that though the myocardium in general gave marked evidence of fatty degeneration, the His bundle was but very slightly affected. Waxy degeneration with interstitial changes was found in scattered areas of the bundle, but never invoking more than one-half of its diameter. Injection of large doses of diphtheria toxin into rabbits failed to produce lesion of the His bundle. Rohmer believes that no

selective action exists on the part of the diphtheria toxin for the tissue of the His bundle. But the toxin may so affect the functioning power of the bundle that heart-block may be produced without demonstrable lesions.

Mackenzie emphasizes the importance of recognizing the youthful type of irregularity, which is characterized by the varying length of the long pauses between the second and first sounds and occurs in perfectly healthy hearts. The writer has never found a single case of this form of irregularity in the young associated with true heart failure. The presence of heart murmurs in the young is not to be construed as evidence of heart failure. Where this is present in the young the signs of myocardial insufficiency are invariably present. The only reliable method of estimating the condition of the heart muscle is to gauge its efficiency to find out how the heart responds to effort, and to recognize the symptoms which indicate its exhaustion. Subjective symptoms are thus of prime importance.

Turnbull calls attention to the fact that the appearance of extrasystoles, single or multiple, in the child strongly suggests the presence of myocardial change, if the extrasystoles have not previously been present. Such children should be especially carefully watched. If the cardiac instability increases, active progressive myocardial change is probable with resulting serious prognosis.

Pisek and Coffin have found the polygraph of undoubted diagnostic aid in cardiac conditions of childhood, used in conjunction with the ordinary methods of examination. The information so obtained is of value for prognosis and treatment. Digitalis heart-block should be suspected where the pulse becomes irregular under the use of this drug.

Respiratory arrhythmia is very frequent in childhood and is not always physiological, but may be an indication of myocardial change.

Landis and Kaufman examined ninety-nine children brought to clinic for suspected tuberculosis, with reference to the presence of venous hums; eighty-one were clinically non-tuberculous. Of the ninety-nine children ranging in age from five to fifteen years, eighty-four (84.8 per cent.) showed the hum; of these thirty-nine (46.4 per cent.) were anemic, forty-five (53.6 per cent.) were not. So far as their observations go, the authors say that the venous hum is present in the majority of children under fifteen, tending to disappear at about that age. The only relationship that could be established between the murmur and anemia was that it had less tendency to disappear in the recumbent posture when anemia was present.

Hecht reports two cases illustrating the occurrence both of functional and organic heart-block in childhood. The organic case occurred in a child of three, after diphtheria. The bradycardia was extreme; the tracing showed a block; atropine had no effect. The functional case also occurred in a child of three after measles. The electrocardiogram showed a block. Under atropine the bradycardia disappeared, and eight days later the bradycardia disappeared spontaneously.

Hamburger notes that between the ages of eight and fourteen unusual hardness and size of the arteries have been observed. Hamburger ascribes this to nervous vasomotor influences. The condition is especially apt to be present in high strung neurotic children upon whom the demands of school life fall with particular emphasis. It is to be regarded merely as exaggerated tonus of the arteries.

Hoobler calls attention to the value of his method for graphically and

automatically indicating both systolic and diastolic blood-pressures in childhood. His experience has been that his instrument (the details of which can be found in his first publication on the subject, *Medical Record*, December 30th, 1911) compared very closely in efficiency with the Erlanger sphygmomanometer, that it indicates both pressures automatically and visibly, that it eliminates the element due to the personal equation, and finally that it is of special value in children, since it permits the use of the leg when the arm is too small.

Leitao has made a series of measurements of blood-pressure in two hundred healthy children from one to five years of age, 70 per cent. being in the first year. The blood-pressure is usually low in infancy, averaging about 70 mm. in the first six months of life, going up very slowly to the fifth year. The pulse pressure increases progressively, being relatively higher than in adults. Artificial or mixed alimentation has a decidedly hypotensive action.

DIAGNOSTIC AND THERAPEUTIC NOTES.

DISTILLED WATER IN THE TREATMENT OF SYPHILIS.—Stephens (*British Med. Journ.*, April 5th, 1913). A new method of treating syphilis, which may prove quite baseless, but on the other hand may turn out to be important, has been suggested by Stephens. Various chemical and physiological experiments, undertaken by him in recent years, have convinced him that alterations of surface tension play an important part in reparative processes and especially in the production of antibodies. Obviously the simplest method of producing such changes in surface tension, within the organism, is by means of the hypodermic injection of distilled water. This he has done in a series of cases of syphilis, chiefly ulcerative, and apparently with marked results. The ulcers healed rapidly and, in all the cases, the patients were soon in a condition to leave the hospital. An interesting feature of the observations was the occurrence of a local reaction, shown by the appearance of an area of inflammatory erythema about the margin of the lesion, after each injection of water, although the injection was made at a point distant from the lesion. Unfortunately, the observations were very incomplete and uncritical. No Wassermann reactions were recorded and the later development of the cases not followed. Too much importance should not be ascribed to the communication at present, and certainly the method is not yet ripe for general use.

CHRONIC APPENDICITIS.—Krecke (*Muench. med. Wochenschr.*, No. 11, 1913). It is notorious that operations for chronic appendicitis by no means always result in complete relief of the symptoms. The proportion of failures reported by eminent surgeons is far from uniform, varying from very few according to Sonnenburg to 40 per cent. in the careful statistics of Melchior and Loeser. Krecke has followed up the results in 70 cases, in which operation showed chronic inflammatory changes in the appendix. Of these, 21 cases (*i. e.*, 30 per cent.) were not relieved by operation. What is the cause of this large proportion of failures? Apparently the fact that in these cases, the chronic inflammatory process was not confined to the appendix but involved the cecum and probably all or part of the colon. This condition (mucous colitis) is characterized, on the one hand, by a catarrh of the mucosa and, on the other, by a weakness and atony of the muscularis, sometimes perhaps by an excessively long mesentery.

The differentiation between this condition and true appendicitis is obviously very important. The following suggestions are based upon the writer's extensive experience:—

1. In appendicitis the character of the pain is apt to be boring or cutting, in colitis more of a dull ache or discomfort.
2. The site of the pain in appendicitis is primarily the right lower

quadrant, whereas in colitis other portions of the abdomen are often involved.

3. A paroxysmal occurrence of the attacks speaks rather for appendicitis.

4. An influence of exercise or menstruation upon the pain suggests colitis, appendicitis being usually uninfluenced by external factors.

5. If repeated examination shows the site of tenderness constantly localized at McBurney's point, the diagnosis of appendicitis is justified. In colitis there are usually also other points of tenderness, especially over the sigmoid flexure. On the other hand, a true recurring, chronic appendicitis may, on repeated examination, fail to show any points of tenderness.

6. A sausage or cushion-shaped resistance in the ileocecal region speaks for a colitis, or at least for a participation of the colon in the chronic inflammatory process.

7. Constipation, fermentation, mucus in the stool, are signs of colitis. The latter may, however, be the cause or the result of a chronic appendicitis.

8. An improvement of the symptoms, as the result of a physical and dietetic therapy, speaks against appendicitis.

9. General neurotic symptoms speak against appendicitis.

In the concrete case the diagnosis may be very difficult or even impossible. Two precautions will often save the surgeon from failure. First, a diagnosis should never be made as the result of a single examination. Tenderness, constantly confined to McBurney's point, is of the greatest importance. Secondly, the general, especially the psychic, make-up of the patient must be considered. If the patient is neurotic, or obsessed by a fear of appendicitis, great caution in making a diagnosis is necessary. Often enough, a definite diagnosis will have to be deferred and the patient instructed to return at the first recurrence of suspicious symptoms. This course is much to be preferred to operation in the absence of definite indications.

ARSENIC IN SARCOMA.—Seeligmann (*Muench. med. Wochenschr.*, No. 12, 1913). The patient, a girl of fourteen, presented herself with a large spindle-cell sarcoma of the right ovary, which was successfully removed. A year later, a recurrence of the tumor formed a mass that nearly filled the abdomen, crowding stomach, liver and diaphragm upwards. It also involved the last dorsal and first lumbar vertibræ, causing unbearable pain. An exploratory laparotomy showed the tumor to be quite inoperable. In view of the fact that Sick had used atoxyl injections in cases of bone sarcoma, with temporary benefit, the author inaugurated a series of arsacatin injections, 0.1 grm. being administered intravenously, once a week, with a four weeks' pause after each series of four injections. The tumor also was subjected to x-ray exposures, for the details of which the reader must be referred to the original. The tumor rapidly diminished in size, the pain ceased and the patient gained in weight and strength. When she was presented before the Hamburg Medical Society, three months later, no evidence of a tumor could be made out.

Whether the case will remain free from recurrence, and what part in the apparent cure was played by the arsenic and what by the x-rays, remains uncertain. At any rate, the brilliant result, obtained in this ordinarily hopeless condition, is of great interest.

A SIMPLE TEST FOR UROBILIN.—Hausmann (*Deutsch. med. Wochenschr.*, No. 8, 1913). It is often of interest, especially in cardiac and hepatic cases, to test the urine for urobilin. The writer advocates the use of copper sulphate for this purpose. To 10-20 c.cm. urine add 20-40 drops of a 10 per cent. solution of copper sulphate; shake gently and add 2-4 c.cmf. chloroform. After shaking carefully once more, the chloroform is allowed to settle to the bottom of the test-tube. Urobilin colors the chloroform from yellow to dark red, according to the amount of urobilin present.

THE TREATMENT OF WOUNDS WITH SUGAR.—Magnus (*Muench. med. Wochenschr.*, No. 8, 1913). The antifermentative action of sugar is known to every housewife. At the surgical clinic at Marburg, its effect upon wounds has been studied. Superficial wounds were sprinkled with sugar; deep and especially undermined ulcerations were packed with sugar and covered with a dressing. The result was strikingly good. The necrotic process with its bad odor ceased, the wounds became clean and the production of granulation tissue was powerfully stimulated. Tuberculous ulcerations, however, were scarcely affected by the sugar treatment.

Sugar as a surgical dressing seems thus thoroughly satisfactory. Its chief field will doubtless be the emergency treatment of wounds, since it is usually at hand.

THE PHENOLSULPHONEPHTHALEIN TEST OF KIDNEY FUNCTION.—Fromme and Rubner (*Muench. med. Wochenschr.*, No. 11, 1913). In the Charité Hospital at Berlin, the method of Rowntree and Geraghty has been tested on a large material and found trustworthy with one modification. Instead of injecting the solution intramuscularly as advised by the originators, much better results were obtained from intravenous use. The former method gave very irregular results and, sometimes, in healthy subjects, an excretion so much delayed as to suggest a nephritis. With the intravenous administration, on the other hand, the results were uniformly satisfactory.

STOOL DISINFECTION.—Kaiser (*Archiv fuer Hyg.*, Vol. 48, Nos. 4 and 5, 1913). The disinfection of the stool is as difficult as it is often important. The mere addition of antiseptics, such as phenol, sublimate or formalin is quite insufficient. A method, depending rather upon thermal than chemical action, has been worked out by Kaiser. Small pieces of quick-lime, amounting in all to about one-fourth the volume of the stool are added to the latter. No stirring or breaking up of the stool is necessary. Hot water (50° to 70° C.) is poured over the mixture and the whole set aside for two hours. Disinfection is then complete.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D., Lond., M. R. C. P.

At the risk of being thought desirous of merely reporting the sensational, I would wish briefly to recount some most remarkable work that has lately been done in London by Dr. Helen Chambers, that was reported on the 20th of last month, at the Middlesex Hospital, on the occasion of a meeting of the Pathological Section of the Royal Society of Medicine, and that has since been communicated to the Royal Society itself. (The Royal Society, as it is generally spoken of, be it noted, is that great and venerable institution that meets at Burlington House, and whose fellowship is indicated by the coveted appendix to one's name of the letters F. R. S. The Royal Society of Medicine is another, and a purely medical institution.)

Dr. Helen Chambers has been engaged for some time in the prosecution of research work concerning the thyroid gland and exophthalmic goitre, and, not very long ago, came to the conclusion that, in many thyroids removed from cases of the latter disease, foci of inflammation or of reaction, suggestive of parasitic causation, are present. An obvious extension of her work was, then, to examine the blood of these cases for the possible presence of organisms, of one kind or another. It was found that, in every case so examined, the presence of a spirochete, closely resembling the *spirochæta pallida* was easily demonstrated whenever a simple and ordinary technique was adopted, so many as ten organisms being seen in a single microscopic field, if examined by dark ground illumination. These results are in themselves remarkable enough, and obviously, the fact that in Chagas' disease a trypanosome is present, was at once recognized as relevant. But the investigator went on to examine the blood in cases of other diseases; and, finally, in seemingly healthy persons. The astounding conclusion has been forced on her, and on us all (for, so far as I know, no rebutting evidence is forthcoming) that this spirochete, now spoken of familiarly as the 'new spirochete,' is present in almost everyone! More than this it is hardly possible to say with safety at the moment, but the idea seems to be that at some time or another this organism gained access to the blood-stream of human beings, and that it has since been transmitted from parent to offspring by means of the placental circulation. The suggestion is also made that this spirochete is provocative of many forms of dermatitis, of anemia, of rheumatoid arthritis, and of other degenerative diseases. In fact, it is a little difficult to restrain the imagination when considering the extraordinary conclusions to which Dr. Helen Chambers' remarkable observations seem to lead us. It is, of course, being asked, Why was not this discovery made

before? The simple answer apparently is that no one had ever thought of applying the technique to the blood of the ordinary Londoner.

A point that is bound to be raised, however, sooner or later, is whether or no the presence of this 'new' organism in the blood-stream is related to the practice of vaccination.

In connection with Chagas' disease, just referred to, and the fact, mentioned in my letter printed in your issue for May (p. 472) that Dr. Langmead has recently observed in London a case of 'nervous cretinism' of the type described by McCarrison as occurring in Chitral and Gilgit, it may be of more than passing interest to observe that Chagas himself, in a striking paper, published in the *Nouvelle Iconographie de la Salpêtrière* for January-February, 1913, insists that a very large proportion of the cases of infection by his trypanosome, resulting in thyroiditis, develop symptoms of cerebral diplegia, varying in severity from absolute spastic palsy and idiocy to mere increase of the knee-jerks, and uncertainty in walking. Since Dr. Langmead showed his case in March, I have, at the Belgrave Hospital for Children, come across four or five similar ones, in which indications of some dysthyreosis are existent in combination with more or less 'spastic diplegia.' All the little patients are improving, both in respect to their nervous and their other symptoms, with thyroid extract; and there can be no doubt as to the accuracy of McCarrison's and Langmead's observations. The obvious question now is, What is the relation of the parasite to the disease, in Chagas' affection? and what relation, if any, is there between the organism discovered by Dr. Helen Chambers, and the forms of cretinism seen in England? I ought perhaps to emphasize the point, insisted on both by McCarrison and by Chagas, that, in the cases of cerebral diplegia observed by them to be associated with indications of dysthyreosis—and in McCarrison's experience, amenable to thyroid treatment—the signs of cretinism are not very marked. In other words, in 'nervous cretinism' the cretinous symptoms are those of thyroidal insufficiency of moderate degree rather than of total functional deficiency.

Last week, Sir William Whitla, the distinguished physician and teacher, from Belfast, came over from Ireland to deliver before us, at the Medical Society of London, what is known as the Annual Oration. In his address he dealt with a subject that is peculiarly his own—the trend of thought in recent pharmacological research. With great acumen, the orator insisted that the researches of Crum Brown and Fraser, in 1868, on the action of methyl-strychnine, really constituted a point of new departure in therapeutics, from which many of our present lines of advance have proceeded.

These workers, it will be remembered, showed that, if the radical methyl were linked to the nitrogen of the complex molecule of strychnine, the physiological or pharmacological action of the alkaloid was remarkably altered. The convulsant effect on the cells of the cord gave place to a paralytic one. In this discovery lay the germ of what we have since recognized as the connection between physiological action and chemical constitution; a point which need hardly be labored. Sir William's oration, which appears both in the *Lancet* and the *British Medical Journal* for to-day (June 1st) should certainly be read with attention, for in it hardly a point is missed. But, rather oddly, no reference was made to Rogers' remarkable discovery that amebic dysentery is perfectly amenable to a few injections of hydrochloride of emetine. Even in England this seems to have attracted little notice, though I see, by the French medical press, that that great nation, with their huge colonial empire, is

fully alive to its importance, and is inclined very justly to hail Rogers, of Calcutta, as one of the great benefactors of mankind.

The great discussion on Alimentary Toxemia, to which I made some allusion in my last letter but one, has at last been drawn to a conclusion, and the final speeches will be, very shortly, published textually. Those which made the most impression on me were by Dr. McCulloch and Dr. von Ofenheim respectively. The former, as in a letter printed in the *Lancet* for May 17th, lays great stress on the part played by the lymphatic system, in the acquirement of immunity, and on the fact that "breaks in the lymphatic chain" underlie many pathological processes. The white cells delivered by the lymphatic glands into the lymph-channels pertain to the lymph, and not to the blood; and, in McCulloch's view, transport bacilli from the submucous and subdermal capillary reticulum, digesting them on the way, to the lymphatic glands themselves, where the detritus sensitizes the germinal matrix at the glandular hilus so that succeeding generations of leucocytes are immunized.

Dr. von Ofenheim declared that the question really before us in dealing with autointoxication from stasis is not so much a question of fighting one or other species of organism, as of either preventing the autolysis of organisms or of shortening their stay in the bowels. He believes that it is the presence of immune bodies, paradoxical as it may seem, that actually is the cause of the disease. He finds, too, that a healthy, non-constipated person has not a smaller but a larger number of bacteria in his colon than has a constipated and self-poisoned person. Moreover, in the feces of the constipated there are countless involution forms showing that the organisms are undergoing the changes that occur in stale laboratory cultures wherein the young bacteria are overloaded with products from old and dying ones. Dr. von Ofenheim said much more that may be profitably thought over, though, very naturally, notions such as his, antagonistic to so many settled convictions, do not always command immediate assent.

June 10th.

PRACTICAL MEMORANDA.

Acute idiopathic torticollis and lumbago are, according to recent studies by Robin, practically always of rheumatic origin, the lesion being articular or periarticular of one or more of the vertebral joints and the deformity due to reflex spasmodic contraction of muscles for the purpose of fixation and comfort. He insists that the condition should be combated both by local and general treatment. Internally he recommends sodium salicylate up to 60 gr. daily. If, however, relief is not obtained in forty-eight hours this is discontinued and the patient is given sulphate of quinine—a daily, single dose of 15 gr. for four days. When pain is severe he combines 8 gr. salipyrine and 1 gr. caffeine with $2\frac{1}{2}$ gr. of quinine and gives two such doses every twenty-four hours. Jaborandi in the form of an infusion in brandy and water is most useful, but must not be used in the presence of a weak or diseased heart.

Locally friction and massage with calmative liniments should be used. He does not believe that immobilization is indicated in the acute cases.

Fractures at the ankle have since the advent of the x-ray been shown to be more common than was formerly believed. Many cases of 'bad sprains' are in the radiograph seen to be fracture of the malleolus. Hence in all doubtful cases the x-ray should be used. Where this is not possible, treat as a fracture. Our best results, even in sprains, have been obtained by the use of a fixed dressing for two weeks, after which massage, local heat and passive motion are used until complete function is regained.

The gonococcus enjoys the reputation of being hard to grow—at any rate it does not grow easily in ordinary media. Oliviero after much experimentation has announced that the gonococcus may be obtained very readily by the following simple procedure. To 10 c.cm. of the urine of the patient, add 1 c.cm. of any blood serum whatever. This constitutes the culture medium. Tubes are inoculated and incubated at 36° - 37° C. After twelve hours a cloudy deposit can be seen, and after eighteen to twenty-four hours the microscopical examination may be made.

He also asserts that the gonococcus has a fermentative action, similar to that of the micrococcus ureæ decomposing urea into carbonate of NH_3 .

In a recent issue of the JOURNAL mention was made of the treatment of amebic dysentery and amebic abscess of the liver by hypodermic injections of emetine. Rogers, of Calcutta, has reported 25 cases of amebic dysentery so treated of which 21 were cured.

Emetine is an alkaloid obtained from ipecac. The hydrochlorate is used and the dose is 3-4 cgrm., hypodermically, twice daily.

All who operate are familiar with the fact that a needle-holder, and particularly that type provided with forceps handle, has a special aptitude for mixing itself up with the other instruments and losing its identity among them when most needed by the surgeon. Such action, on the

part of the needle-holder, leads to loss of time and sometimes to loss of—shall we say?—dignity on the part of the surgeon. To prevent this, Dr. Francis Reder, of St. Louis, has hit upon the excellent and novel plan of having his needle-holders copper-plated. The color is thus in such marked contrast with that of the other instruments that a glance only, at any moment, suffices to reveal the whereabouts of the so-often-missing needle-holder.

Dr. Ernst Saxl, of St. Louis, in a recent address before the St. Louis Medical Society announced his discovery of a method for the prevention of symblepharon after burns of the conjunctiva. The method is a very simple one and in his hands has given excellent results. It seems to me to be physiological therapeutics. The method is as follows: After washing out the conjunctival sac with normal saline, a drop or two of adrenalin chloride 1-2000 is instilled. This is repeated with sufficient frequency to keep the conjunctiva blanched. Thus no fibrin can be thrown out and without the organization of exuded fibrin there can be no adhesions. The treatment is continued until healing is complete.

Intractable vomiting of pregnancy is, according to Sergeant and Lian, due to suprarenal insufficiency. They have reported 6 cases in which the vomiting existed with other signs of suprarenal insufficiency and which were completely cured by the administration of suprarenal extract. They believe that the vomiting is a symptom of toxemia, that the toxin at fault is produced normally by the cells in the chorionic villus and that these toxins are absorbed by the blood of the mother, and owing to suprarenal insufficiency are not eliminated as they should be.

They habitually use 0.3 gm. of the dry extract of suprarenal capsules two or three times daily or 20-30 m. of a 1-1000 solution hydrochlorate of adrenalin. But the total dried extract is the better of the two. The solution has the advantage that it may be given hypodermically when the stomach will tolerate neither it nor the dry extract, but the disadvantage is that it does not contain all the active principles of the gland.

After operating on men for inguinal hernia there is often a sense of distress and discomfort in the testicle of the operated side during the first forty-eight hours. This is much relieved and often prevented entirely by properly supporting the testicle after the operation. Usually after such an operation (as, in fact, after most others) the normal 'tone' of the dartos muscle is lost for a few days and the whole weight of the testis is borne by the cord. This latter is to a greater or less extent inflamed for a few hours, at least after all hernia operations in males. Hence the pain and ache; and these are increased by the weight of the testis.

It is hard to arrange a bandage to give much support and one does not want to turn the scrotum up onto the abdomen under the dressing lest it contaminate the wound. I have used for some time a strip or two of adhesive as a shelf for the scrotum, and it works well.

After the usual dressing is secured in place with adhesive strips, an assistant holds both scrotum and penis vertically up and then draws them toward the abdomen. The thighs of the patient are extended and approximated, and a strip of adhesive stuck on the anterior aspect of one thigh near its outer side on a level with the root of the scrotum and then carried straight across to the other thigh and attached to it in like manner. The strip should be at least 3 in. wide. The scrotum and testes are now allowed to rest on this 'shelf.'

BOOK REVIEWS.

INCREASING HOME EFFICIENCY. By Martha Bensley Bruère and Robert W. Bruère. New York: The Macmillan Company. 1912. Price, \$1.50.

Frederick W. Taylor states that his book on the "Principles of Scientific Management" was written to show that the remedy, for what the country is losing through inefficiency, is general scientific management, a science resting upon clearly defined laws. In applying his efficiency method to industry, he knew what each plant is trying to produce.

The advantage of a thorough appreciation of the good points of efficiency could not be better illustrated than has been done in this interesting book in which its best tenets are applied to the most universal of all businesses—the proper conduct of a home. What should a home stand for? what ought it to be to invite only kindly criticism? A satisfactory answer to these two questions is essential in any attempt to show how home efficiency can be increased—the task which the authors have set before them. And that they have done their work well is evident in many respects, for the volume contains much information—in tables, in figures, and in that manner of writing which is not only convincing but of a literary quality that must enlist the attention of every intelligent reader.

ANTS. Their Structure, Development and Behavior. By William Morton Wheeler, Ph. D., Professor of Economic Entomology, Harvard University, etc. etc. New York: Columbia University Press. 1910.

This latest and most comprehensive work on ants undoubtedly has found its way into the libraries of zoologists, entomologists and probably of all myrmecologists. However, it may not have obtained the attention of the medical profession to the extent it well deserves, since it is a fact that our interests lie in preference with the study of the higher animals—those that in structure and behavior are most like ourselves. Nevertheless, it may be stated here that the medical mind has always been appreciative, on account of a partial similarity to our own conditions, of the habits of those lower animals which, by force of an extraordinary instinct, are compelled to live permanently in intimate consociation. A study of the striking resemblances and far-reaching differences between ant and human societies, of problems of heredity, development of species, of comparative psychology and of similar problems, so thoroughly presented in this work, cannot fail to prove instructive and attractive, especially to those medical men whose studies are not altogether limited to purely medical problems.

SURGERY. Its Principles and Practice. By Various Authors. Edited by William Williams Keen, M. D., LL.D., Emeritus Professor of the Principles of Surgery and of Clinical Surgery, Jefferson Medical College, Philadelphia. Volume VI. With 519 Illustrations, 22 of them in Colors. Philadelphia and London: W. B. Saunders Company. 1913. Price, \$7.00.

This is the most valuable volume in the system. The authors, with one or two exceptions, cover the subjects which were fully treated in the previous volumes, and in the present instance give us the last and best knowledge that is at their command in a field in which they primarily are illustrious. While in a way it corresponds to an annual, it is different and better, for the authors do not merely abstract what literature has appeared since their original articles were written, but use their ripe judgment in selecting what is best. There have been new departments of surgery opened up in the past seven years—notably thoracic surgery, which is covered by several excellent chapters, one particularly on intratracheal insufflation. Inasmuch as all the subjects covered in the original work are brought up to date in this volume, it would be an endless task to attempt to comment on the individual chapters; but the interest that one finds in each is much greater than in the original volumes, or in any collective abstract dealing with these subjects.

FLATULENCE AND SHOCK. By F. G. Crookshank, M. D. Lond., M. R. C. P., Physician (Out-Patients), Hampstead General and N. W. Lond. Hospital, etc. etc. New York: Paul B. Hoeber. 1913. Price, \$1.00.

This little monograph contains two medical essays, one on flatulence and one on shock. After going through the forty odd pages, one is almost impelled to pass over the matter, though this is of first-rate importance, and speak only of the style, for there is an indescribable charm of diction, smoothness of phraseology, and continuity of thought in these pages. There is no surer remedy for our misplaced admiration of the efforts of American writers than to read the medical essays of those English masters of diction—Osler, Albutt, Goodhart, Paget, and now Crookshank.

There is no attempt to record personal experimental data, and consequently one lays the little volume down with the satisfaction that comes from an impersonal account that is not affected by one's own notions as shown in the clarifying efforts of a second party. Flatulence is divided into seven groups, and for these several various types, various therapeutic agents are recommended. Under the title of shock, the author merely touches upon the rôle of the autonomic nervous system, the adrenals, acapnia, and the vasomotor functions, finally drawing the not unimportant conclusion that every individual may be regarded as possessing a definite "shock value."

A TREATISE ON HYGIENE AND PUBLIC HEALTH. With Special Reference to the Tropics. By Birendra Nath Ghosh, L. M. S. (Cal. Univ.), Fellow of the Royal Institute of Public Health, London, etc. etc., and Jahar Lal Das, L. M. S. (Cal. Univ.), Health Officer, Maniktala Municipality, Calcutta, etc. etc. With an Introduction by Colonel Kenneth Macleod, M. D., LL. D., F. R. C. S., Indian Medical Service (Retd.), etc. Calcutta: Hilton and Company. 1912. Price, 5s.

While not pretending to originality, this work is a well-balanced and carefully-prepared compilation of the data relating to public hygiene, specially written for the use of men practising in the tropics.

In the words of Macleod, who writes the introduction to the book, the chief merit of the treatise "depends on the clearness and accuracy with which it sets forth in plain and simple language the facts and doctrines bearing on causation and prevention, which have been accumulated in recent years, and the most easy and effective manner of their practical application."

The application of scientific hygiene to health problems in the tropics is a movement which promises great things; and in the present volume we have an example of a work that is admirably adapted either as a textbook or manual for native or other physicians and students in warm countries.

TEXT-BOOK OF MEDICAL JURISPRUDENCE AND TOXICOLOGY. By John J. Reese, M. D., Late Professor of Medical Jurisprudence and Toxicology in the University of Pennsylvania; Late President of the Medical Jurisprudence Society of Philadelphia. Eighth Edition. Revised by D. J. McCarthy, A. B., M. D., Professor of Medical Jurisprudence (Geo. B. Wood Foundation) in the University of Pennsylvania, etc. etc. Philadelphia: P. Blakiston's Son and Co. 1911. Price, \$3.00.

This new edition of a widely and favorably known textbook needs little introduction to the medical and legal professions. Suffice it to say that, without sacrificing the original modest dimensions of the volume, the editor has introduced a number of alterations and additions, placing the work abreast of the latter thought and investigation in this broad subject.

Among the more extensive changes may be noted the chapter on insanity, which has been practically rewritten, and the classification changed to conform to modern ideas. A new chapter on the Commitment of the Insane has been added as well as new matter in the realm of toxicology, *e. g.*, anaphylaxis, formaldehyde poisoning, chronic bismuth poisoning, etc. The index is inadequate.

THE MOSQUITO. Its Relation to Disease and Its Extermination. By Alvah H. Doty, Formerly Health Officer of the Port of New York. Illustrated. New York: D. Appleton and Company. 1912.

This little volume is a popular account of the mosquito with special relation to its extermination. While a number of scientific data are contained in the text, the greatest merit of the work is the extreme simplicity of its language, making it suitable for, and interesting to, the general reader. There are eleven illustrations, most of which are after Howard.

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EDITORIAL.

THE NEW POET LAUREATE.

No doubt there will be great rejoicing in the medical world that Dr. Robert Bridges has been appointed Poet Laureate of England and no doubt many nice things will be written about his medical career and about his poetry. Of the former, it may be said that it was just as uneventful as are most medical careers, and that as Casualty Physician at St. Bartholomew's and Assistant Physician at the Children's Hospital, Great Ormond Street, he achieved the distinction of commanding the respect if not the admiration of his confrères. When he retired from the practice of medicine in 1882 at the age of thirty-eight, he went out of the medical fold quietly and unostentatiously, and perhaps also without deep regret on the part of the English medical profession; and when he made his first steps to Parnassus, we take it, the same unostentatious spirit prevailed. Now all this is most commendable in a world of strife and noise, where stridence only too often humbugs us into the belief that we are *vis-à-vis* genius. But though in the practice of medicine the man who is silent and painstaking and hard-working is really an asset, since his whole life is a protest against the worst phase of city noises—the medical man of so much ego that he needs must shout about his worth in the streets—in the matter of poetry, however, the quiet talent that shuns tumultuous thoughts, the wan talent that wraps itself safely in a garment of sedate and inoffensive philosophy, the talent that trickles on from hexameter to hexameter with never a decided stir in the limpid stream, is not an outstanding talent, though we may not be at all enraptured of noise, flamboyance, and garishness. Of course, as medical men we should not make light of the fact that the new Poet Laureate gained his first spurs in the province of medicine; but would

not our rejoicing be greater were we in a position to say that the virility which rightly belongs to the strong man in medicine is in his poetry, just as we are bound to say that the strong individuality of Masfield is reflected in his poetical offspring, the audacity of Kipling is evidenced in his strongest work, the joy of living, which is Noyes' philosophy, is reproduced in the freedom of his song with its good cheer and valor and strong accents, and the untrammelled mind of Watson, tempered by culture and classicism, is typified in the cathedral sonority of his best poems?

Yes, truth to say, in none of the poems or plays of Bridges is there the faintest adumbration of the influence of the science of medicine on an exceptional mind, let us say, during its most receptive years. But what we do find in his poetry are some pretty rhyming, an almost effeminate touch as of one afraid to speak the truth, a respectability of thought that must be most pleasing to the Super-puritan, and withal a gentleness and refinement that is so much the chief factor of his work that a great degree of emasculation is achieved. Take his poem "The Affliction of Richard," for instance,—and this is cited here because so eminent a critic as Arthur Symons quotes it in his essay on Bridges to illustrate "nobility of character, a moral largeness, which becomes one with an intellectual breadth, a certain gravity, simplicity, sincerity,"—and read bravely through its mawkish sentimentality and then try to figure that once upon a time Bridges practised medicine and saw real suffering and was brought into close apposition, not with one facet of life, but with nearly all. What the thought of the reader would be, it would not be hard to guess; for, if we understand the medical mind, we are sure that despite its shortcomings—and these are plentiful when it is called upon to judge poetry—it would make short shrift of such inanities. But would it act so quickly and decisively after reading a Masfield poem—not "The Widow in the Bye Street" or "Daffodil Fields," but "The Story of a Round-House" and, especially, those incomparable lines addressed by the poet to his mother "C. L. M.," or after reading Kipling's "Dedication" or Watson's "Wordsworth's Grave"?

We have had doctor-poets before—Akenside, Keats, Holmes and others—and we are proud of them, especially of Keats, though, to be sure, his medical career is not once reflected in his poems. But Keats was hardly a practising physician—he was dresser at Guy's, that was all—and his genius as a poet was of such splendor that even had his life been prolonged or had he not forsaken medicine at so early an age, we doubt if the science of medicine would have influenced his later poems. But, despite his genius as a poet, so independent of its environment that it required no sustenance but was sufficient unto itself,

who can tell but that his limited experience as a physician gave it a fuller note than it would have had without this broadening experience? And even though this surmise is wrong, what medical man, whose readings outside medicine have given him a taste for literature, is not carried off his feet, so to speak, by the beauty and splendor of a Keats line? But who can say the same after reading Bridges even at his best, with his respectability of thought, his middle-class sanity, his thin interpretation of Elizabethan poetic thought, and his studied imitations of Greek and Latin verse?

'OLD AGE' AGAIN.

A subject that has an undying freshness should not be allowed to lie fallow; and of all subjects, which are embraced by preventive medicine, the matter of how to avoid old age, or rather how to enjoy it with a certain degree of juvenility despite its insuperable drawbacks, easily ranks first. Just as there are various treatments for every disease, so there are various kinds of advice for this affliction; and surely if one does not improve under advice, does not reap everlasting benefits, must not the failure be attributed to a stubbornness that is almost abnormal? Now it is not our intention to cast ridicule on the many gratuitous warnings, both mild and thunderous, that have been spread before those who are about to cross the threshold of middle age, nor are we a foe to a plan for the betterment of the physical and mental condition of the aged so that a semblance of rejuvenescence will fall to their lot; but when we read the multifarious books on the subject and learn that some of the writers are so keen on diet that the mental make-up of the aged is quite forgotten, while others are just as keen as regards the mental improvement and consider diet of secondary importance, we are quite at sea and so befogged that even one thinnish but straight, clear ray of light would be most welcome. So it happens that when a book on old age, that is really overflowing with sanity, reaches our desk, especially after we have wearily ploughed through other books that have failed to enlist our attention with profit, our rejoicing is excessive; but this should not be attributed by the reader to undue emotionalism, but to the gratification of a wish, kept alive despite many setbacks, that one of these days a book would appear that would grant its fulfilment. Such a book is "Old Age: Its Care and Treatment in Health and Disease" by Robert Saundby, M. D. Edin., F. R. C. P.*

*London: Edward Arnold. 1913.

Now, what is there about this book of Dr. Saundby's that gives us pause? Nothing startling, to be sure; nothing sensational; but withal a manner of looking things square in the face and philosophically taking things as they must be. But this does not mean that he gives no advice as to exercise and diet, that he thinks once old age has vanquished the last remnants of youth the best way of meeting it is with folded hands and an air of resignation, that to bear in silence is the lot of man. Still, even admitting a show of enthusiasm when he writes that exercise of a mild sort should be practised—walking not to the point of fatigue, but to that degree which makes it pleasurable and beneficial—and that eating too much causes indigestion and goutiness, it must be confessed that he is but a mildly enthusiastic St. George in combat with the dragon of old age. He knows that it is inevitable and that, though its discomforts can be allayed to some extent, the cocksureness of the medical man, who asserts that this matter of senility is really the fault of the individual because he is opposed to reason, to common sense and to 'inspired' medical thought, is really carrying the matter to very false Pisgah heights, indeed. But not so modest are other medical reformers in this special line, if we take Dr. I. L. Nascher and his most recent contribution* seriously, for there we learn that Nature can be met at all points and quite successfully; hence, if the senescent will but learn how to live on twenty-four hours a day, not in the Arnold Bennett way, but in Dr. Nascher's, they may not be as young in feeling as they were some forty years before, but the results will be gratifying. Space does not permit us to quote the passages which are really necessary to prove our point that Dr. Nascher is just a bit too optimistic, but it would be doing him a great harm, now that our contention is that he is too hopeful a fighter against the invasion, not to show by quotation that some of his advice is impracticable. For instance, when he says: "I have on several occasions spoken of the beneficial psychic influence of flattery, the stimulation of the sense of pride, especially pride in appearance, sexual relations with young mates, and social intercourse with the young generally," he is really preaching a dictum that is quite revolutionary, and that once followed by old men would do much to upset our most cherished thoughts on society. Moreover, would young men stand for this? would they not regard it as a form of 'sabotage,' inasmuch as their methods as wooers and flatterers would be usurped, aye, even ruined; for can it be denied that after a sensible young woman has been courted by a septuagenarian or octogenarian she would ever again be deceived by the blandishments of aspiring young men?

*Longevity and Rejuvenescence (*New York Med. Journ.*, July 12th, 1913).

Now, although Dr. Saundby is quite sedate as regards his outlook on the trials of old age, which he says are tempered ever and anon by compensations, and Dr. Nascher is just the opposite when he views the situation; there is a link, albeit slender, which we would fain throw between the mild pessimism of the former and the rabid optimism of the latter. This link has not been suggested by a medical man, but by a lay writer in an essay in a recent number of the *Saturday Review* (reprinted in the *Living Age* of July 12th), in which is mentioned a letter in the *Times* signed 'Senex,' that puts forth the rejuvenating effects "this frolicsome elder" experienced watching his daughters turkey-trotting with the boys, "who reminded him of his golden youth." Thus the reader can readily see how useful this negroid dance may be to those who have the interests of the aged at heart: in case the medical man is a follower of Dr. Saundby, a mild, refined version may be prescribed; and in case the medical man is bitten with Dr. Nascher's theories, a more violent version may be used—one of enough sexuality to counterbalance all thought of "sexual relations with young mates."

OPINION AND CRITICISM.

ARE THE SEXES GROWING MORE ANTAGONISTIC?

If we are to believe the medical philosophers and lay essayists, as well as the biologist of a recently published book,* the sexes are growing not only more apart, but a real antagonism has been set up by the present partial emancipation of woman, which will increase to greater lengths when her much-desired millennium arrives. That this thought is not of an evanescent nature is proved by the many articles it has already called forth and which no doubt it will continue to call forth in the next few years; hence, the conclusion must be that here is a subject of so great a vital interest, of so momentous an import to the welfare of a nation, that all other subjects—at least, at the present moment—are of second rank. At least, that is our inference from Mr. Heape's book, and since his work is about the most complete on the subject, it would be well for those who are interested in this new problem, or rather in its modern exacerbation, to halt a bit in their dalliance and ponder it well.

According to Mr. Heape, man has always practised exogamy for the reason that his one thought is sexual gratification, and to get this at its fullest, he has always, whether aborigine or civilized, gone outside his tribe or class—that is, outside his immediate environment—to seek his mate. Woman, on the other hand, whether of the primitive sort or of the modern, has the maternal instinct developed at the expense of the sexual; hence, she follows the totemic law which, according to Dr. Frazer—the best authority on totemism, in Mr. Heape's opinion—"may perhaps be found in the mode by which the Central Australian aborigines still determine the totems of every man, woman, and child of the tribe. That mode rests on a primitive theory of conception . . . they imagine that a child only enters into a woman at the moment when she first feels it stirring in her womb." In other words, exogamy "is derived from a purely Male sexual impulse," whereas totemism "is in no sense dependent on sexuality, [but] is purely a maternal scheme; as a Feminine creation it could not have reference to anything else, and, as Dr. Frazer shows, it has reference to nothing else. My [Mr. Heape's] endeavor has been to show that totemism is more nearly related to the yearnings of maternity." Therefore, if the exogamous law governing the life of the male and the totemic law governing the life of the female are disturbed, the results will be disastrous, so says Mr. Heape; and that they are being greatly disturbed to-day, this author deeply deplores, for out of the disturbance, he asseverates, will necessarily come—what with woman's enlarged sphere of activities: her desire to work, to have

*Sex Antagonism. By Walter Heape, M. A., F. R. S. London: Constable and Co. 1913.

a voice in civic matters, to enter the arena of polemics—a lessening of her maternal instinct, but not a lessening of the sexual desire in the male!

If Mr. Heape is right when he says: "To the Male the gratification of the sexual impulse is the ultimate end of his generative instinct, beyond that he has no interest," and that "the ultimate end of her [the Female's] generative instinct is the production of offspring and their true nurture . . . her sexuality is a means of attracting the Male, a means of ensuring maternity, it is nothing more than that to her," then the matter is closed, for there is no need for argument; but if he is wrong the need for discussion will at once be apparent to the reader. Of course, as a generalization, what Mr. Heape says may be true, if by generalization is meant the universal applicability of a principle to all human beings irrespective of their heredity, their shades of thought, their many-faceted and not readily-to-be-understood temperaments. But would not this be a mistake? Would not this line of reasoning be on a par with what frenetic eugenists have taught us when they insist on the same ideas being applied to humans, which work wonderfully well in animals when carried out by breeders? Surely, though we have been taught that the male has strong sexual powers that must be gratified and that his supremacy is due to these, and that the female has powers which are of a decidedly lower degree, and that her mission on earth is to gratify the male and have no other thought but the idea of becoming a mother, and though Mr. Heape repeats all this with emphasis, would it be an attack on science (?) for us to say that, though as a principle this reads very well, as a dictum by which the human race should abide it invites severe criticism? And it invites this criticism, not because we are in fear that if the emancipation of woman is complete her maternal instinct will be killed off, and hence the finest expression of sex antagonism will obtain, but because to persist in the belief that the modern man and the modern woman are what Dr. Frazer and Mr. Heape would want us to believe—fac-similes of the sexes among the aborigines—is in reality taking but small account of the commendable changes wrought by civilization in the sexual life both of man and woman.

LITERARY NOTES.

One should not be too critical of a book that was inspired by a reverence that is quite unusual in biographical writing; but even with this thought in mind it is almost impossible for the present reviewer not to be critical opposite so rapid, so futile a story of a man's life as is Mrs. Saxby's "Joseph Bell: An Appreciation of an Old Friend" (Oliphant, Anderson and Ferrier, Edinburgh and London). That a better story of Joe Bell, as he was familiarly called by his confrères and friends in Edinburgh, could have been written by a stronger hand, a hand that had a surer literary touch, even though the extreme reverence characterizing this volume was lacking, will become evident to the reader directly he reads this puerile attempt at biographical writing; and by 'better' is not

meant a more detailed account of the gentleness, charity and kindness of this Edinburgh surgeon, but a pen-picture that would convey to the reader a much better idea of the really important chapters in the career of so striking a personality in the medical life of Edinburgh as was Dr. Bell. Aside from a mawkish endeavor to make her hero a being of such superlative attributes—not mental, but moral—that the reader yawns from sheer *ennui*, the authoress seems beset with the idea that the fact that Conan Doyle built his creation, Sherlock Holmes, out of material gathered from certain characteristics peculiar to Dr. Bell was indeed an unholy act, and that not only is she strongly opposed to the world linking the two men together, but that her hero was ever on the alert to repudiate the likeness, in fact was decidedly irritated by any reference to points of similarity. Now the fact is that Dr. Bell thought a deal of Conan Doyle, his former pupil, and though we are not in a position to asseverate that he was not irritated to some extent by remarks made by those ignorant of his position in the medical world, we cannot but think that his finely tempered mind stood him in good stead, and that when too much was not said about his being the prototype of the Conan Doyle creation he took the matter good-naturedly. Surely, there is nothing in the character of Sherlock Holmes that indicates criticism of Dr. Bell; and even though the detective's methods of work in ferretting out crime were almost an exact copy of the physician's method of tracking down disease, can anyone in his right senses blame the novelist for using so excellent a model? Yet, despite our disapproval of the authoress' point of view in this matter and her lack of judgment in not availing herself of more interesting material when she undertook the writing of her 'Appreciation,' the mechanical part of the book—the letterpress and the illustrations—deserves the highest praise. Rarely, indeed, has it been our good fortune to see combined in the same volume a like number of good points in the art of book-making.

Novels depicting the inner life of hospitals have in the past met with severe criticism, for the contention has been that the description has invariably been the sort that appeals to the gallery. It is not so many years ago that Hall Caine's "The Christian" was smashed into smithereens, as it were, by medical critics, because the novelist described the laxity which occurred at a hospital ball; and quite recently a novel entitled "In a Cottage Hospital" by George Trelawney met with a like reception. Thus it can be seen that the novelist who tampers with the conditions which are part and parcel of hospital life runs the risk of incurring the displeasure of medical critics, for their sensitiveness is of so high a grade that it would seem the slightest pinprick causes them to run amuck. Let us hope that when they read "The Night Nurse" by the author of "The Surgeon's Log" (Chapman and Hall, London) their judgment will exclude all sensitiveness, for here is really a good novel of hospital life evidently written by one who knows whereof he speaks. Without slander, the author yet depicts the realities of a hospital in a way that can be described only as realistic, and by this is meant that the truths are those

that invariably occur when men and women are daily brought into contact. It is well in its way to imagine that in hospitals human beings are so deeply engaged in their work that all thought of sex attraction is lost sight of, but this would be taking small account of human nature and also of the verities. There were *réal* scandals in the hospital which the author describes and there were also scandalous tongues that builded scandals when there was no foundation; there were self-sacrificing men and women and there were small-minded men and women who saw harm in the most innocent acts; there were 'residents' who were human, all-too human, and there were others who were shining examples of probity, honesty, and uprightness. Hence the picture that we get is not of the impressionistic sort with faint lines here and there that require the imagination of the reader to fill out and thus complete, but a large canvas over which move, in all their distinctness, the figures that are peculiar to hospital life—the house-surgeons, the sisters, the nurses and, that formidable personage of all hospitals, the matron—with no glozing over of petty faults, of human weaknesses that run to bickering, jealousy, and the besmirching of others. But the high lights of human nature are not forgotten, and even during the most painful episode in the book, which the author calls "A Tragedy in the Night," the tension brought on by the disgrace of a nurse and the subsequent suicide of Michael Hickey, one of the 'residents,' is lessened because of the nobility, the kindness, the reticence of the house-surgeon, Dermot Fitzgerald. Surely this book is not for Puritans; but what medical man who has had any hospital experience would wish a story that does not visualize the imperfections as well as the perfections of human nature?

If all books written on sex education were as sanely conceived and as carefully written as is "Youth and Sex" by Mary Scharlieb, M. D., M. S. and F. Arthur Sibly, M. A., LL. D. (T. C. and E. C. Jack, London; Dodge Publishing Co., New York), small complaint would be made by the reviewer who is constantly called upon to give his opinion of the multifarious books on this subject which come to his desk. But they are not, and more's the pity, for the subject is really worth while, and to destroy all interest in it by writing in an asinine way is indeed a matter for much criticism. Still, let us be grateful that occasionally a book on this subject falls into our hands that has enough good points to make us forget the weary hours we have spent reading the innumerable compilations that for monotony and utter lack of thought outshine all other books in the medical book-world to-day. And with this thought in mind let us examine the book under consideration with the care it deserves. In the first place, the candor of both writers is to be commended because it occurs in a most natural way, that is, it is not put forth to gain applause on account of daring, but is so intimate a part of the various chapters that without it, we are sure, the authors' purport of telling more than half-truths would be frustrated. Not that candor is always lacking in the other books on sex education; but even when it is affected it is only too

often indulged in to tell the reader something that no one else would dare tell above a whisper, or lugged in to make the account as lugubrious as possible. But aside from the spirit of candor which pervades the pages of this book, there are the commendable points of simplicity and directness, with no thought whatever on the part of the authors to shine on account of startling discoveries. Dr. Scharlieb writes with a pen that is never divorced from common sense and with a seriousness and insight o'ertopped with trenchant criticism, especially in her remarks about the almost total lack of English gymnasia where gymnastics à la Ling can be taught to adolescent girls. And throughout her thoughtful essays there is that sympathetic attitude towards her subject that can come only from a combination of true womanliness and the deeper culture of wide study. When we turn to the chapters written by Dr. Sibly, we soon discover that we are in the presence of a man who handles his subject without gloves. It may strike the lay reader that his remarks about the prevalence of impurity among boys is exaggerated, but surely the medical reader will agree with him, at least, the medical reader who has not wrapped himself up in a Puritanism of narrow confines. Of course, every parent believes in the purity of his young son, in the blandness of his mind that takes no note of "degraded ideas on the subject of sex," but Canon Lyttleton, Mr. A. C. Benson, the well-known essayist, and Dr. Clement Dukes—the former two distinguished modern teachers and the latter "the medical officer of Rugby School and the greatest English authority on school hygiene"—class nearly all the boys in the English public schools under the same head—namely, models of impurity of speech if not of acts. Nor are the private schools any better, according to the author; hence, it can at once be seen that that piece of fiction—the pure-minded school boy—does not really exist to any appreciable extent. What can be done to uproot the foul ideas that invade a boy's mind through association with those of his own age whose talk runs on sexual matters is the object of Dr. Sibly's chapters; and that he has the English equipoise to look the matter unflinchingly in the face and in a hopeful mood, even though among school boys the degradation is too widespread to be combated with ease, makes his chapters doubly interesting, since we are just a bit tired of hearing from too many writers on this subject that once a boy harbors impure feelings and habits we might as well give him up as a bad subject for reform under a moral training.

Erratum: In Dr. Noble Wiley Jones' article "The Medical Aspect of Abdominal Ptosis" published in the July issue of the JOURNAL due credit was not given to Dr. R. C. Coffey, of Portland, Ore., author of "The Principles Underlying the Surgical Treatment of Gastro-Intestinal Stasis, Due to Causes Other Than Stricture or Ulcerative Conditions" (*Surgery, Gynecology and Obstetrics*, October, 1912) for the use of illustrations 1 to 15, or to Dr. Franklin H. Martin, Editor of *Surgery, Gynecology and Obstetrics*, through whose courtesy they were reproduced. The Editor of the JOURNAL takes this occasion to correct the oversight.

ORIGINAL ARTICLES.

ULCERATIVE COLITIS.

By ANTHONY BASSLER, M. D., of New York,
Professor of Clinical Medicine, New York Polyclinic Medical School
and Hospital, etc. etc.

There are no diseases in which so little careful work has been done as in the states of ulceration of the colon. It was up to very recent times that ulcerative colitis was a disease of the post-mortem table; it was seldom diagnosed during life (with the exception of tropical dysentery), and no attempts had been made in differential diagnosis between the various forms of ulcerative colitis and their treatments. Even to-day, confusion exists between ulcerative colitis and tropical dysentery, and there are those who still assert that all cases of ulcerative colitis are examples of tropical dysentery.

Ulceration of the colon resembles that of the skin and lining membranes in that it may result from a number of causes and exist in different forms. Among such may be mentioned its secondary forms as seen in nephritis, gout, or plumbism, and the primary forms of amebic dysentery, Shiga's bacillary dysentery, enteric fever, tuberculosis, malignant disease, and syphilis.

Much of the confusion pertaining to the subject is due to the fact that clinicians have failed to recognize the great number of different causes of ulceration in the colon, and, confusing several together, have attributed all to one cause. In this way all cases of ulcerative colitis came to be considered a fatal disease; a common error which is prevalent to-day. With the use of the microscope, work in bacteriology and parasitology of feces, and the employment of the sigmoidoscope, much light has been shed on these disorders, and the time has come for differentiation between the various forms, for some are entirely curable when recognized and treated properly.

It is not the purpose of this paper to enter into a complete exposition of this disorder, including the secondary forms, and those due to tuberculosis, malignant disease, or syphilis. The writer desires more particularly to confine himself to the bacillary types of endemic amebic dysentery, epidemic bacillary dysentery, and the form that he has drawn attention to—namely, the coli infections, and to present another case of the latter.

Pathology.—Many different types of ulceration are seen in the colon, and in any one form of the disease, such as amebic dysentery, these lesions are varied as to location and extent, particularly in the ulcerations. In some cases the mucous membrane is so destroyed by ulceration that little normal membrane can be seen anywhere in the entire colon, while in others there are only a few isolated ulcers in one or more parts of it. While, however, the entire colon may be more or less ulcerated, most cases show only a part of it to be broken down in ulcerations, although in such lesions as abscess or peritonitis, the general mucous membrane inflammation extends beyond these. The typical lesions vary in size, from quite small punched-out ulcers, the size of a pea, up to large, irregular tracts covering many inches. When examined during life with a sigmoidoscope the ulcers may be seen to be raised and to have a bright red areola, or the appearance of an acute inflammatory colitis with small or large areas of ulceration, superficial in depth and appearing as if only the upper portion of the mucous membrane had been peeled off. Fine granulations may be seen in the bases of them, and white mucus, a yellow slough, or a mucopurulent matter adhering to the surface. These sloughs, however, quickly become detached by the constant diarrhea, and consequently are not commonly found in post-mortem specimens. The ulcers begin in the hollows of the bowel, such as in the depressions between the valvulæ conniventes, and in the bases of the sacculi. When the disease is extensive, the ulcers tend to run together and become confluent, so that they assume a most irregular outline. Other cases are seen where the mucous membrane seems to project in small polypi with swollen mucous membrane and ulceration surrounding them. In some cases the ulceration runs longitudinally and in others circularly. Where the ulcerations are deep there is usually some local peritonitis and adherent lymph on the outside of the bowel, and in a few of the cases, the mesenteric glands may be enlarged.

There is nothing distinctive in the microscopical appearance of ulcerative colitis. Sections of the wall of the colon through an ulcerated area show the ordinary characters of simple inflammation. In the less severe cases the glands of Lieberkuehn are seen to have undergone cloudy swelling and to contain fibrinous material in their lumen. The submucosa is usually much thickened, highly vascular, and there is a general round-celled infiltration. The muscular coat is infiltrated with leucocytes, and where the ulceration is deep, the fibres are destroyed. The peritoneum is thickened.

Among the outside lesions that may be noted is the result of the perforation of the bowel, such cases usually showing the perforation in the cecum or sigmoid flexure. A feature of these perforations is that many of them occur without causing general peritonitis; only a local abscess or pericolitis resulting with adhesions shutting off the general peritoneal cavity. A large-sized secondary abscess in the pelvis may occur. Adhe-

sions between different coils of the bowel or between the colon and the parietal peritoneum are not uncommon in long-standing cases, and once or twice it was found that on separating the adhesions several ulcers had perforated. Although abscess of the liver is a common complication of amebic dysentery, it is uncommon in other forms of ulcerative colitis; in fact, there are only four cases on record. Lastly, it may be said that a general peritonitis may result from ulcerative colitis without any perforation being present.

In the amebic dysentery, the large intestine is chiefly involved, and the most striking feature in the chronic cases is the great thickening of its walls. This may be confined to the submucosa or involve all the coats. It is always more marked in the submucosa and is due to a general edema and localized areas of thickening. The other characteristic lesions consist chiefly of hemorrhagic catarrh, of raised hemispherical areas of infiltration protruding above the level of the surrounding mucosa, and at least of three forms of ulceration—namely, a diphtheritic process added to the amebic one; a studding of the entire intestine with small ulcers added to the amebic one; and only a few ulcers added to the amebic one. Lesions are seen on the outside of the gut wall, and necrosis and abscess of the liver are common. More than that, a peritonitis, some involvement of the lower end of the ileum, swelling of the mesocolon glands, and chronic parenchymatous nephritis may exist.

In bacillary dysentery the large gut may be infected from the ileum to the rectum, and the mucous membrane reacts by inflammation which may be catarrhal, hemorrhagic, or diphtheritic, according to the stage and grade of the process. The diphtheritic infiltrated mucous membrane becomes necrotic and the ulcers are produced. While the elevated parts of the mucous membrane may be infected, most of the ulceration is in the folds spreading from these points outward. The process is more marked in the flexures of the bowel than in the rectum. In the beginning of the catarrhal period of the disease, the surface of the mucous membrane has a grayish-red, velvet-like appearance. After this the membrane becomes red and swollen in consequence of hyperemia and catarrhal edema. This is succeeded by necrosis of the epithelium until gradually the necrosis proceeds in the deeper parts, and the whole wall of the bowel becomes thickened. In contradistinction to the undermined ulcers of amebic dysentery, which increase deep in the mucous membrane, the ulcers in epidemic dysentery are only accompanied by the damage of flat layers with irregular borders.

In the type of dysentery which the author has drawn attention to, neither the amebæ nor the Shiga bacilli were present. A recapitulation of the advance as published in the *Medical Record*, October 7th, 1911, is presented as follows: "The reason of the observation in these cases was to note if possible whether there was anything distinctive in the character of the organisms predominant in the intestinal canal of the cases, which

apparently were of the colon group. For this purpose loops of the mucus adherent to the upper rectum and sigmoid and scrapings of the ulcer bases were used in the examinations and in the inoculating material in the culture work.

"In each instance it was evident that the *B. coli communis* was the infecting organism, the mucus being charged with them, and in the ulcer scrapings it was shown that these organisms had gained entrance into the tissue walls of the gut and were living and probably proliferating there. Scrapings from the mucous membrane of the upper rectum and colon in seven healthy persons did not show the presence of the *B. coli communis* within the tissue of the gut wall when proper precautions had been exercised in the scrapings. In each of the cases the organisms grown in culture were Gram negative, flagella were noted in the form of one (not the other three); they were non-liquefying, grew readily on all of the culture media (and characteristically in large opaque colonies on the gelatine and most abundantly on potato), produced organic acids in milk, fermented glucose solutions with the production of acid and gas, and did not produce indol in ordinary nutritive broth (two of them did in Witte peptone solution), and the intraperitoneal injections of the bacteria grown from all of the cases were fatal, within four days, to a rabbit, guinea-pig, and cat in each instance—all the animals dying within fifty hours, excepting a cat, which lived ninety-three hours.

"It was this definite pathogenesis in lower animals (in which it was evident that these organisms were more regularly fatal than is one's experience with the usual forms of *B. coli communis*) that suggested the making of agglutinating reactions with the serum and organisms from the cases with controls of those of other strains in the hope that some facts might be gained in identifying the type of organisms at work in the condition. In each instance it was found that the serums from these individuals agglutinated their own strain of organisms more definitely than they did the *B. coli communis* obtained from innocent sources; still it was evident that the blood of these patients agglutinated the *B. coli communis* of innocent forms more actively than did the blood-serums of normal individuals—this being manifested in seven cultures from different normal persons (swabs of the high rectum and scrapings of the sigmoid membrane and the separation of the *B. coli communis* used to obtain the innocent forms). The bacterial deductions from the observation of these cases suggested the following:—

1. That there is a chronic form of dysentery due to the *B. coli communis*, and that these cases are not uncommon in the temperate climates.
2. That the form of infecting organisms does not correspond to the Shiga or the mannite-fermenting types, and that they are not possible of differentiation from the known forms of *B. coli communis* of high virulence.
3. That the serums from the cases strongly agglutinated the organisms

obtained from these persons and more definitely than they did the strains of *B. coli communis* obtained from innocent sources.

4. That the organisms were most fatal to lower animals, decidedly more so than is one's experience with the human *B. coli communis* ordinarily obtained and used in laboratory observations.

5. That the organisms existed in large numbers in the lower intestinal tract of the cases, mostly in the mucus, and that they are capable of destruction of tissue locally with the production of ulcers, and then living within the tissue of the gut wall in the bases of them.

6. That in the etiology of these cases we are dealing either with a definite organism of the *B. coli* group, or with *B. coli communis* of a high virulence, strongly hemiparasitic in nature and from which the aggrassin production is overwhelming and against the effects of which in susceptible individuals the body cannot resist local tissue infection.

7. That the clinical entity 'Chronic dysentery due to the *B. coli communis*' seems warranted, and further that there is reason for the belief that in the production of this disease we are dealing with an organism of the colon group specialized in nature."

Symptoms.—The symptoms of these three types of ulcerations may be presented *in toto*. The main one of which that draws attention to the disease is diarrhea. This may begin suddenly accompanied by severe abdominal pain, or, more rarely, may come on insidiously with a slight looseness of the bowels. Usually the patient states that the pain and diarrhea started quite suddenly, without any very apparent cause. The stools increase in frequency, and blood appears. The ordinary remedies, as a rule, have no effect upon the diarrhea and the patient rapidly loses weight and becomes extremely ill. The number of stools varies considerably; a common number is six to eight, but as many as twenty in twenty-four hours are not unusual. The stools are quite watery, and contain comparatively little fecal material, consisting mostly of mucus, blood, pus, water, undigested food, and bacteria. In severe cases of ulcerative colitis, the food passes through the alimentary canal with surprising rapidity, sometimes, after ingestion, appearing in three hours. The amount of blood in the stools varies; in some cases it is considerable, while in others it is only present occasionally in small quantities. It is usually fluid and intimately mixed with the stool, but may appear as small jelly-like clots.

The desire to go to stool is sudden and urgent, but defecation is not, as a rule, accompanied by tenesmus, unless there is ulceration in the rectum. There is not infrequently considerable abdominal pain and tenderness. The pain is referred to the abdominal wall, but is not well localized. The tenderness is most marked in the left iliac fossa and in the left loin, but often extends over the whole colon, even to the cecal region. In amebic colitis a mass corresponding to the extent and depth of the bowel-wall infection may be noted on palpation.

The progress of the disease varies a good deal, and depends upon its

nature and the extent of the lesions. Most patients, however, get rapidly worse, going steadily downward from the first, lose much in weight, seem unable to digest anything, and in a few weeks become wasted skeletons. Others seem to go on for months, sometimes a little better, and sometimes worse, and others again, after a severe attack lasting several weeks or months, get better and remain well for a time, only to have renewed attacks, which, as a rule, are more severe. It must be remembered that there are a number of types of ulcerative colitis in which the symptoms are never severe and the patients are able to go about, though frequently troubled with diarrhea. In a practical way, it may be assumed that where the symptoms are comparatively mild, the condition is not ulcerative colitis; on the other hand, it must always be kept in mind that a marked ulceration may exist with comparatively little diarrhea history.

The temperature is raised two or three degrees, and if careful record is made of its irregularity, it generally suggests septic poisoning. Other cases, however, have no rise in temperature, or very slight. All observers agree that relapses are very common in those cases which are not fatal. When death occurs it is usually due to exhaustion and wasting, less frequently to perforation and general peritonitis, and in a few instances to hemorrhage. At the present day, the diagnosis should not be difficult, as the pelvic colon is always involved, and this can be directly examined with the sigmoidoscope. The instrument must be used with great care, because the bowel wall is weak and friable. In experienced hands, there is no risk in using the sigmoidoscope, but no one who is unaccustomed to the instrument should attempt an examination in suspected ulcerative colitis. By its use, the condition of the membrane, location and extent of the ulceration, and many points regarding the inflammation and its character are readily noted.

The diagnosis being made, the next step is to study the bacteriology of the feces for the cause. In amebic colitis, the characteristic unicellular parasite, possessing the endosarc and ectosarc with a motility of the organisms, is seen. Fresh stools should be examined which have been kept warm up to the time of the examination, for the amebæ lose their motility in stools at or below 75° F. These organisms vary in size and are usually of a fairly uniform diameter, while in stools that have remained standing for some time they may become encysted. They then appear to be surrounded by a coating of two layers, and it is sometimes impossible to differentiate them morphologically from other substances.

In bacillary dysentery, the differentiation of the organism is not so easy, although simple enough when one is familiar with the laboratory procedures and possesses the necessary apparatus. The dysenteric bacilli are small, plump rods with rounded ends, very similar to colon bacilli. They are usually single, but occasionally occur in pairs. They are not motile, and no flagella can be demonstrated. There is no spore formation. The bacillus stains readily with the ordinary analine dyes, but is

decolorized by Gram's method. To differentiate them, cultural methods are necessary, and for the detail of this the writer refers the reader to textbooks which would guide him. In the *B. coli communis* form, which the writer has drawn attention to, the organisms can be differentiated from the dysentery bacillus and even from other forms of *B. coli communis*. The detail in this has already been mentioned and need not be gone into again.

Treatment.—The diagnosis being made, one is to be guided by the character of the infection and the extent of the lesions together with the general condition of the patient. Since amebic dysentery is an acquired disease accomplished by the ingestion of the ameba in food or drink, it is a preventable one and may even be avoided when the malady exists endemically. Drinking water is the most usual medium, and hence only that which has been sterilized should be used. A reliable bottle of aërated water is the safest to use in localities where the general water-supply is infected. All foods which are brought in contact with the surface water of such communities, such as the vegetables, should not be taken. Patients with an acute onset or acute exacerbations of the disease should be confined to bed. The diet should begin with nothing but rice or albumin water, milk being added later on. Rest being most essential, hypodermic injections of morphine may be given. Local treatment of the bowel is contraindicated, for, under the conditions of rest, the inflammation of the bowel usually subsides, and, if this is accomplished, the condition improves. As the symptoms begin to abate, Dover's powder may be given and a more liberal diet. In some cases sodium bicarbonate in combination with bismuth gives good results, and in these instances large doses of both should be given. For the past few years a number of articles have appeared on the use of ipecac for the cure of this condition, but the writer is inclined to believe that it is not generally curative although local benefit may always be brought about by it. For the more innocent small form of ameba, the ipecac or emetine hydrochloride administration is specific. After a time, local treatment by rectal injections and irrigations is most efficacious, the best solution for this being one containing quinine. The patient being in the proper position, the fluid should be introduced with a short tube, and about 2 litres of a 1 to 5,000 or 1 to 1,000 solution of quinine given. This is gradually increased in strength to 1 to 500, the enema being retained as long as possible. One or two enemas daily are usually sufficient, although in certain cases in robust individuals, as many as three may be employed. Usually more enemas than this do more harm than good. There is a number of cases in which the parasites persist even after all symptoms have disappeared, and we are not able to rid the patient of them by any known means. In such instances, one has the choice between continuing the treatments over lengths of time or the performing of an appendicostomy or cecostomy and washing the colon out from the head of the large intestine down. In

such instances, when the amebæ persist in the stools, or the ulceration continues, the fistula in the head of the large intestine should be kept open, and the irrigations persisted in for a number of months before it is allowed to close.

The treatment in bacillary dysentery is essentially the same as the above—namely, keeping the patient absolutely at rest and warmly covered: inhibiting the stimulating factor in the intestine by attending carefully to the diet; and proceeding with the etiological treatment. Very small quantities of food should be given at any one time, and the interval should be shortened to about every two or three hours. Most authors have agreed that calomel has the best effect in the beginning of the disease, and for this purpose it may be used to clean out the bowels and to hinder the extension of the disease upward. In addition, the patient is ordered to take acid drinks, and given enemata of saline or soda solution to remove the stimulating and infectious contents of the bowel and to resist the processes into the mucous membrane. The use of methylene-blue enemata have been advised, and, according to Berther, may produce signal results.

The chronic form is rather differently treated. The enemata that are best in this connection are silver nitrate in dilution of 1-500 to 1,000, tannin 0.25 to 0.5 per cent. solution, thymol 1-500 to 1,000 dilution, resorcin 1 to 2 per cent., creolin 1 to 2 per cent., lysol 1 per cent., and the like. In some cases the enema with gum Arabic mixed with bismuth, gallate of bismuth, or iodoform gives good results. As an internal remedy, salol, tannigen, ichthyol and calomel may be used. Of late, serum treatment has been employed for the chronic forms of this infection, and quite remarkable results have been reported by it. Inasmuch as it can do no harm and is based upon specific medicine, it should be employed in these cases, and such serum is readily purchasable. For the mild cases it should be injected in doses of 10 c.cm.; in the medium cases, the serum is twice injected in doses of 10 c.cm. at intervals of from six to ten hours, and, in the severe cases, the amount may be between 40 and 60 c.cm., but when given daily not more than 20 c.cm. at a time. The serum treatment shortens the recovery from the disease, quickly cures or markedly ameliorates the mild cases, and strongly affects the medium and severe ones. In the latter two, the improvement of all symptoms is noted on a day or two after the injection, and remarkable results may be seen in a week's time. Where the ulceration is well established, the action of the serum is not so pronounced as in the earlier stages. Nevertheless, healing of the ulcers with cicatrization often takes place. In such cases, moreover, the fever is reduced, the number of stools is markedly diminished, the general condition is improved, and the appetite increases. Even in this stage, the results obtained are far better from the serum treatment than those obtained by any other method. The mortality of this form of dysentery under the use of serum had been reduced to one-third

of what it was, and at least to one-half from that obtained by medical treatment. In Russia, Rosenthal has had only 8 deaths among 157 cases (5.1 per cent. mortality) under serum treatment, while the mortality in Moscow was between 12 and 17.5 per cent. without serum treatment. In addition to this, appendicostomy or cecostomy with irrigation is advisable in severe cases.

In the *B. coli communis* infections of a chronic nature, rest is not so important as in the foregoing two, although advisable. The diet should be fluid in type, and semi-solid with scraped meat when the diarrhea has subsided. The usual methods for the control of diarrhea are in order, and irrigation of the bowel by enemata with the various solutions are called for. The writer has treated 4 cases, that had considerable ulceration along the aforementioned lines, with autogenous coli vaccines, and the cure took place, in each instance, in about three months' time. He desires to present the following case, which presents points in the diagnosis, and one in which extremes of methods of treatment were employed in the first instance with gratifying results.

CASE I.—S. R., native of United States; occupation, bank clerk; *æt.* eighteen; admitted to the Peoples Hospital, March 4th, 1912. Service of Dr. Charles Kennedy.

Family History.—Father and mother, living and well; three sisters and two brothers, living and well.

Previous History.—Had measles at the age of three, but was never ill otherwise. Never had any acute infectious disease nor conditions suggesting pulmonary trouble. Had his tonsils removed about a year ago. Weight, 97½ lb.

Present Illness.—About a month ago, patient gradually acquired a diarrhea which at first amounted to between four and five bowel movements a day, these gradually increasing in frequency. About ten days ago, he had as many as fifteen movements a day. As the diarrhea became more marked, he lost in general weight and strength, and blood was noted in the stools. He has no pain before or after his meals, nor any pain in the abdomen. Went to several physicians who had given him medicines for the diarrhea and some had made efforts at dieting. Finally, he landed in the hands of a well-known gastroenterologist who diagnosed a tubercular colitis, advised his parents to take him home, saying that he would not live very long. He was placed in bed in the hospital, and his temperature line was watched for five days; beginning with 100° F., it mounted to 103° and 104° F. each day, usually at about 4 p. m., dropping to almost normal between 4 and 8 a. m. On the fifth day, in the hospital, the writer examined him and found a markedly emaciated young man with the general appearance of mild sepsis. His pulse was 100, respiration 26; voiding a normal amount of urine a day, and that day had had nine diarrheal movements, consisting chiefly of mucus and blood. There was a slight tenderness on deep pressure over the sigmoid which was lost in the loin on that side. Sigmoidoscopic examination showed the presence of an ulceration, large in extent, practically involving the entire bowel wall and beginning at the level of the first rectal valve and extending upward as far as the instrument was introduced. This ulceration was shallow and looked as if the mucous membrane had been peeled off. The entire rectum was generally involved in the intense ulceration, which continued upward, and blood and mucus were constantly intruding into the lumen of the instrument. The

bacteriological examination of his feces showed the presence of a Gram negative stool with very few cocci. There were no tubercle bacilli present, but pus cells and epithelium were numerous. The urine was negative and the blood showed the presence of 19,000 leucocytes, with a differential count of 79 per cent. polymorphonuclears; 8 per cent. large lymphocytes; 12 per cent. small lymphocytes; and 1 per cent. eosinophiles. The history, the fact that he had been five days in bed on medical treatment without benefit and before that under ambulatory means, the type of the ulceration, and studies which the writer made of the bacteriology of the stools proving a coli infection, together with the septic type of the temperature, seemed sufficient to warrant the performing of an appendicostomy. This was done on the sixth day, and daily irrigations with saline solution were continued up to the time he left the hospital, which was twenty-two days afterward. While in bed his medication was discontinued, and the diet was fluid and semi-solid. After a few days, the hemorrhage and the output of mucus discontinued and the feces gradually took on a solid form. The ulceration healed and there was a subsidence of the inflammation in the mucous membrane. He left the hospital, was advised to go on a general diet of all foods, was given an iron tonic, and he continued to wash his bowel out each day with a saline solution. This was continued for four months, at the end of which time the boy had gained 35 lb. in weight, and was entirely well of all his symptoms. At the present time the appendix fistula is gradually closing, and patient is on a general diet, working each day and entirely well.

MEDICAL ASPECTS OF GOITRE.

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A discussion of goitre seems opportune at this time for several reasons. For some years, the writer has been impressed by the apparently increased frequency of goitre in patients applying for treatment in the Touro Out-Door Clinic. He does not believe that the impression is due entirely to the fact that we have been keener to look for goitres than in former years, for practically all these patients presented themselves for treatment because of goitre. Another reason for the timeliness of this symposium is the great difference of opinion between the internist and the surgeon as to when goitre should be operated.

A few words as to classification may not be out of place. It is not always an easy matter to put definitely a given case in one or the other categories of simple goitre and exophthalmic goitre. The former should include simple enlargements of the thyroid without any constitutional symptoms whatever; but we must not forget that it is quite possible for these simple goitres to appear in individuals already nervously inclined. So it becomes difficult to differentiate between such a simple goitre occurring in a nervous person and one of the rudimentary or incomplete forms of the constitutional, so-called exophthalmic, goitre. Of these latter formes frustes, the writer will speak a little later. The fully developed Basedow's disease presents an unmistakable clinical picture. The rapid emaciation, extreme nervousness, tachycardia, the prominent eyes, the slight rise of temperature, the diarrhea at times—all these taken in conjunction with the thyroid enlargement make the diagnosis easy. The absence of the symptom which has given the disease its name—the exophthalmos—does not by any means exclude the case from the category of goitre with constitutional symptoms; the patient may be suffering just as truly from Basedow's disease as does the patient with bulging eyes. And so any one of the symptoms or signs may be missing; just as we have Basedow's disease without exophthalmos, so we may have Basedow's disease even without goitre. These are the formes frustes to which allusion has already been made. The patient may have only the nervousness, the tremor, the elevated temperature, the diarrhea, and still have Basedow's disease. In a given case, therefore, the question which sometimes arises, as has already been indicated, Is this an incomplete Basedow? or have we to deal with a simple goitre in an individual already and from other causes nervously predisposed?

The relation of these two forms of thyroid enlargement to one another presents an interesting speculation. Are they two separate and distinct diseases, or are they simply different stages of the same disease? The writer quotes from Stuart McGuire who in a recent review has succinctly stated the latter conception: "The difference in histological structure of a normal thyroid and the thyroid of exophthalmic goitre is about the same as the difference observed in the resting and the lactating breast—there is an increase in the number of active cells in the follicles or an increase in the number of follicles, or both. For symptoms of hyperthyroidism to arise, this increase must be sufficiently general to outweigh any retrogressive changes that may be going on in other parts of the gland. There must also be absorption of the secretion at a rate corresponding to the hyperplasia. Otherwise, there follows retention of secretion, enlargement of the gland, and development of colloid goitre with a subsidence of symptoms. Thus it is seen that exophthalmic and simple goitres are not separate entities but stages of one process. Wilson says that a large percentage of cases of simple goitre will reveal a history of definite signs of hyperthyroidism if inquired into and that every case of exophthalmic goitre is hypothetically destined, in order of pathological degeneration, to become a case of simple goitre."

Wilson, of the Mayo laboratories, has made a histological study of the large series of goitres removed in that clinic (over 3,000) and has in conjunction with Plummer tried to bring into relation the pathological findings with the clinical picture. Their classification of the histological conditions met with in the thyroid glands is as follows:—

- I. Embryonic (undeveloped) thyroid.
- II. Normal (resting) thyroid.
- III. Vascular changes.
 - (1) Hyperemia;
 - (2) Hemorrhage (including resulting cyst formation).
- IV. Inflammations.
- V. Progressive changes.
 - (1) Hypertrophy (functional with hyperemia).
 - (2) Hyperplasia (exophthalmic with goitre).
 - (3) Adenomatosis (multiplication of goitre without encapsulation).
- VI. Retrogressive changes.
 - (1) Retention of secretion (colloid goitre).
 - (2) Atrophy (parenchyma).
 - (3) Degenerations.
 - (a) Colloid (of parenchyma and stroma).
 - (b) Hyalin.
 - (c) Amyloid.
 - (d) Calcareous.
 - (e) Cystic.

VII. Tumors.

- (1) Benign.
 - (a) Ictal adenomata (encapsulated).
 - (b) Adult adenomata (encapsulated).
- (2) Malignant.
 - (a) Mesotheliomata.
 - (b) Carcinomata.
 - (c) Sarcomata.

Marine and Lenhart state that the changes in Graves' disease "are not constant, since the exophthalmic goitre syndromes, as at present recognized, may coexist with a normal thyroid, with a colloid goitre, with an actually hyperplastic thyroid, with an atrophic thyroid or with a tumor of the thyroid."

Simple goitres are many times more frequent than are exophthalmics. Thus in a series of 104 goitres tabulated for the writer from the records of his colleague, Dr. C. L. Eshleman and himself by his former assistant, Dr. C. J. Michael, now of Houston, Texas, 84 were simple goitres, while 20 were set down as exophthalmic goitres, certain or probable. At least 9 of the 20 appear from the tabulated analysis to be dubious cases and possibly belong to the class of simple goitres.

Of particular interest are the goitres of puberty. 30 of the 84 simple goitres tabulated by Dr. Michael were noted in girls between the ages of eleven and eighteen. The enlargement of the thyroid at the menstrual periods and during pregnancy has been repeatedly noticed and mentioned by all writers upon the subject of the thyroid. This goitre of puberty is another evidence of the relation of the thyroid to the sexual organs. The prognosis of this form of goitre, as regards a return to normal, is excellent. The gland is symmetrically enlarged and the condition is probably simply a hyperemia with possibly some hypertrophy. In the course of a few months, sometimes in the course of a few years, the enlargement gradually disappears. It is not usually deforming but presents merely an abnormal fullness of the neck. Treatment directed to the thyroid is not indicated and when used is absolutely without effect. All that needs to be done is to give a ferruginous tonic, as most of these patients are anemic. It is important, however, that they be kept under supervision until the recession has taken place, for such an apparently innocent goitre of puberty may later prove to be a true Graves' disease.

When the goitres of young girls are asymmetrical, it is the writer's experience that we are not dealing with a simple hyperemia and hypertrophy, but with a cystic or colloid goitre. In these, the prospect of a spontaneous recession, such as the writer has just described for simple goitres of puberty, is not possible. He wishes to say just here with regard not only to these cystic and colloid goitres, but also with regard to all simple goitres, that it has not been his good fortune to see any of them affected by medical treatment. The simple goitres of early puberty re-

cede spontaneously, the other simple goitres seem unaffected by any form of iodine or glandular medication administered internally. Frankly, the writer has not tried very much in the way of local treatment, because he has always thought the objection of the surgeon well taken—namely, that local treatment of the thyroid by iodine ointment, x-rays, and the like, brought about local changes which rendered very much more difficult the surgeon's task in the ablation if it is finally determined upon as necessary. Surgical interference in the case of simple goitres is called for by two indications (1) cosmetics, and (2) pressure symptoms. When the goitre causes a disfiguring appearance there is no doubt that the removal of a part of the gland constitutes the promptest and most radical and, in the writer's opinion, the only relief. When symptoms of pressure upon trachea or esophagus occur or where we make out by percussion an extension of the goitre downward into the chest behind the sternum, operation should not be delayed.

The question, as to when operations should be performed for the relief of the constitutional symptoms of Basedow's disease, seems to be not so simple a matter as the one we have just been discussing. There is no doubt of the increasing impression among the profession and the laity that exophthalmic goitre is a condition demanding surgical treatment and that promptly. Some of the leading surgeons have gone so far as to claim the disease as entirely and absolutely a surgical condition and to deny a justification for its medical treatment. Let it be conceded at once that the reduction, in the past few years, of the immediate postoperative mortality, in the hands of careful, competent operators to a negligible point, has rendered a judgment in the matter much more difficult than it was in the days of a mortality of from 6 to 25 per cent. C. H. Mayo¹ reported a series of 278 consecutive cases without a death. There are, however, several other points to be taken into consideration. In the first place we should consider what may be termed the secondary mortality of the operations, that is to say deaths occurring some time after the operation and not necessarily due to the immediate effect of the operation. Secondly, we may contrast the ultimate mortality rates with and without operation. Thirdly, we may inquire into the percentages of cures with operation and with medical measures, and discuss what constitutes a cure.

Statistics as to the immediate operative mortality are, as the writer has just indicated, now sufficiently large to be reliable. Kocher has operated upon more than 3,000 cases; the Mayos, more than 1,000 cases; Kronlein, 200 cases. Forchheimer, from whom the writer quotes these figures, gives the Mayo mortality rate as 4 per cent. and Kocher's (last 376 cases) 3.9 per cent. Heinecke in his 500 collected cases found the mortality 5.6 per cent. Of C. H. Mayo's 1,100 cases, 70 per cent. considered themselves cured and apparently they are well. The others were improved but not well on account of late operation when severe secondary effects of disease were present.² Kocher's percentage of cures

in the last 376 cases is stated (Forchheimer) as 76 per cent. Contrasted with these statements should be the claims of the internists. In Volume LXV (1911) of Guy's Hospital Reports, Dr. Hale White records the result of an attempt upon his part to trace the history of patients discharged after medical management during the last twenty years, and he finds in 80 per cent. the recovery has been permanent. Solis-Cohen,³ from whom the writer has quoted, goes on to say: "In my own personal and consultation practice I have had the opportunity to observe, directly through the attending physician, a number of patients for periods of from a few months to twenty-five years after apparent recovery under non-surgical treatment. In but one instance has there been a relapse, and in no case has death occurred from any condition with which Graves' disorder could be causatively associated." Forchheimer⁴ claims "that the results of medical treatment are very favorable; from 70 per cent. to 90 per cent. are improved and cured by it. . . . In the 424 cases considered for medical treatment in this article, only 8 died, less than 1 per cent." Musser,⁵ in a posthumous paper, protests that exophthalmic goitre is not a surgical disease. It must be confessed that as a whole the series of cases presented by individual internists are small as compared with those of the surgeons. On the other hand, the former have the merit of being of longer standing, as they present results of years of observation. A small collection of cases, but worthy of consideration because carefully studied and analysed and because they represent the experiences of one man and not a compilation, is a series of 51 cases presented by Syllaba,⁶ of Prague. These cases were observed during a period of twelve to thirteen years. Fourteen of the patients died; only 10, however, from Graves' disease. The other four deaths could be attributed only indirectly to this disease. His true mortality, therefore, was 19.6 per cent. 4 cases remained unaltered, 7.8 per cent.; 6 cases recurred, 11.8 per cent. His criteria for judging these cases were: "I consider a case cured if

I. The tachycardia has stopped, the pulse keeps within normal limit while the patient is at rest and at the most reaches 80, and palpitation occurs only under conditions normally calling it forth,

II. The exophthalmos has disappeared or receded so that it no longer makes a pathological impression,

III. The goitre has disappeared or become strikingly smaller and the pulsations and murmurs over the vessels have ceased,

IV. The tremor has ceased,

V. The body weight has markedly increased,

VI. The nervous and secretory disturbances have ceased,

VII. The patient no longer gives the impression of being ill either to his family or to the doctor,

VIII. The patient feels well, and

IX. Is as fit for work as he was previous to the illness."

He considers a case benefited in which the tachycardia has stopped, the nutrition has improved, the symptoms in general have apparently been improved, and the patient gives the impression of being better, and himself feels better and more fit to work.

A more accurate judgment both of medical and surgical results in general could be formed if these or similar criteria were uniformly applied. The writer's impression is that if this were done some of the cures after operations would be designated only improvements. Then, too, if the cases were studied some years after the operation, we shall probably find a certain percentage of relapses. That such is the case is indicated by Mayo: "Should there be a relapse after surgical treatment because of too little gland removed or an increase in the remaining portion, it does not indicate a failure in the surgical principle but calls for further operation."⁷

When one has seen, even in a small number of cases, striking results from medical treatment and when one knows of the cases in which spontaneous remissions (with or without the aid of Christian Science) have occurred, it is difficult to convince him that exophthalmic goitre is essentially and necessarily a surgical condition. Nor does the writer believe that surgeons can logically or will assume that position. What he has said as to the possible limitations to be set to the claims of the surgeon is not to be construed as denying that surgical intervention is perhaps the promptest method of breaking the circle which has so often been set up in these cases. The position that the internist occupies, as the writer understands it, is that

1. In a large percentage of cases, probably over half, the results of medical treatment are equally as good as those after operation,
2. A certain percentage of cases will be improved only by operation,
3. A certain further percentage will be benefited neither by medication nor by operation,
4. All cases should be treated medically for a reasonable length of time—say six months—before being subjected to an operation, and,
5. Finally, that cases should be operated upon before serious myocardial or other organic changes have occurred. To that end the medical treatment, when not furnishing evidence of constant improvement, should not be prolonged beyond the reasonable period above indicated.

Before enumerating briefly the medical measures which have been advocated and which promise relief, a cursory reference to the pathogenesis of the disease is not out of place. The most generally accepted theory is that of thyroid over-functioning. The writer need stop only to mention the points which seem to support this view: (1) Basedow's disease has been produced experimentally by injecting thyroid pressure-fluid into lower animals; (2) Basedow's disease has been produced clinically (unintentionally) in the human by the administration of the thyroid extract. On the other hand, as Crile has pointed out in his recent paper, those

who regard the disease as a hyperthyroidism, "must, on the other hand, be at a loss to explain the frequent cure by physiological rest and the relapses that may occur after an apparently sufficient amount of the gland is removed if the patient is again submerged in the environment that originally produced the disease. . . . The infection and the auto-intoxication theories are not at present widely held, and their basis seems insecure." Evidently the nervous system plays a rôle—but how? Marine and Lenhart⁸ believe that the involvement of the thyroid is only a part of a general disease—"the essential physiological disturbance of the thyroid in exophthalmic goitre is insufficiency, its reaction compensatory, and its significance symptomatic."

Very attractive to the medical man, because justifying to a large extent his claim that most of these patients will be benefited by non-surgical measures, is the new kinetic theory of Crile.⁹ The writer trusts that he will be able to give a clear idea of it by the following brief quotation from the article:—

"The following phenomena of worry, nerve strain, and fear are nearly identical with the phenomena of Graves' disease—namely, increased heart beat, increased and altered respiration, rising temperature, sweating, muscular tremors, protruding eyes, loss in weight. . . . Disregarding the thyroid and the exophthalmos if the symptoms of acute fear continued for weeks and months, who could differentiate between Graves' disease and fear? . . . It would appear that under the influence of fear, most, perhaps all, of the organs of the body are divided sharply into two classes: (1) Those that are stimulated, and (2) those that are inhibited. Those that are stimulated are the entire muscular system; the vasomotor and locomotor systems; the senses of perception; the respiration; the mechanism for erecting the hair; the sweat glands; the thyroid gland; the adrenal gland (Cannon); the special senses. On the other hand, the digestive and procreative functions are inhibited. What is the significance of this grouping? So far as we know the organs stimulated increase the efficiency of the animal for flight or fight. . . . Among the organs inhibited are those that have mainly to do with digestion and procreation, and the muscles that are not concerned in a physical defense or escape. Are there any other organs stimulated by fear except those that can or that do assist in making a defensive struggle? I know of none. On the other hand, if an animal could dispense with his bulky digestive and other organs, whose functions are suspended by fear—if he could, so to speak, clear his decks for battle—it would be advantageous. . . . We may say then that fear is a *phylogenetic fight or flight*. . . . And now [man] sitting at his desk in command of complicated machinery of civilization, when, for example, he fears a business crash, it is in terms of his ancestral physical battle in the struggle for existence. He cannot fear intellectually, he cannot fear dispassionately; he fears with all his organs, and the same organs are stimulated and the

same organs are inhibited as if instead of being a battle of credits, or position, or honor it were a physical battle with teeth and claws. Whether the cause of acute fear is moral, financial, social, or stage fright, the heart beats wildly, the respirations are accelerated, perspiration is increased, and there are pallor, trembling, indigestion and so forth. . . . That the brain is definitely influenced, even damaged by fear, has been proved by . . . experiments [upon animals]. . . . The effect of repeated stimulations of the emotions is seen in the destructive phenomena of worry, of fear, and, in a lesser degree, though analogous in principle, the phenomena of sexual love. . . . Whatever the exciting cause of exophthalmic goitre, whether unusual business worry, disappointment in love, a tragedy, a strong fear, the illness of a loved one, an acute infection, overdose of iodine or thyroid extract, or of unknown cause, the symptoms are alike and closely resemble the phenomena of one of the great primitive emotions. . . . The thyroid is stimulated by these emotions and, by reason, the increased activity gives rise to a constant flow of secondary stimulation which continues the disease."

Whether we adopt this theory or not, all must agree—both surgeon and internist—that the most important point in treatment is rest—rest in bed until all symptoms have disappeared. In conjunction with this, hydrotherapy is invaluable: warm baths, cold applications to the enlarged thyroid, ice-bag to the heart for palpitation. In the way of drugs, quinine hydrobromate neutral, arsenic, iron, may be used as tonics. The writer can speak warmly from experience as to the value of hydrobromate of quinine; it has seemed to act almost as a specific.

Digitalis and its congeners are to be used only in the same way and for the same purpose—namely, regulation of the heart—as they are used in other heart conditions. The bromides are useful in quieting nervousness. If we look upon Graves' disease as hyperthyroidism, certainly iodine and all thyroid preparations are to be interdicted. Even if one is inclined to other theories of the disease, the iodine and thyroid preparations must be used with great caution. More logical from the standpoint of hyperthyroidism is the use of organic preparations from thyroidec-tomized animals: antithyroidin (Moebius), thyroidectin, rodagen. The writer's experience with these, as with the cytolytic serum of Rogers and Beebe, is small. The work of Eppinger, Falta and Rudinger,¹⁰ showing the interrelation of the ductless glands, holds suggestions for the future development of organotherapy.

BIBLIOGRAPHY.

- 1 C. H. Mayo (*Journ. Amer. Med. Assoc.*, Vol. LIX, No. 26, July 6th, 1912).
- 2 Jacobson: The Thyrogenic Origin of Basedow's Disease. (*Annals of Surgery*, Vol. LVII, p. 341, March, 1913.)
- 3 Solis-Cohen: The Non-Surgical Treatment of Exophthalmic Goitre. (*Amer. Journ. Med. Sciences*, Vol. CXLIV, p. 13, July, 1912.)

- ⁴ Forchheimer: Therapeusis of Internal Diseases. Vol. III, pp. 904-905. D. Appleton and Co., New York. 1913.
- ⁵ Musser: Problems in the Treatment of Exophthalmic Goitre. (*Amer. Journ. Med. Sciences*, Vol. CXLIII, p. 810, June, 1912.)
- ⁶ Syllaba: The Prognosis of Basedow's Disease. (*Therapie der Gegenwart*, Vol. LI, p. 484, November, 1910.)
- ⁷ Mayo: Factors of Safety in Operating for Exophthalmic Goitre. (*Amer. Journ. Med. Sciences*, Vol. LIX, p. 20, July 6th, 1912.)
- ⁸ Marine and Lenhart: Pathological Anatomy of Exophthalmic Goitre. The Anatomical and Physiological Relations of the Thyroid Gland to the Disease: The Treatment. (*Archives Int. Med.*, Vol. VIII, p. 265, September, 1911.)
- ⁹ Crile: The Kinetic Theory of Graves' Disease. (*Amer. Journ. Med. Sciences*, Vol CXLV, p. 28, January, 1913.)
- ¹⁰ Eppinger, Falta and Rudinger: The Interrelation of the Ductless Glands. (*Zeitschr. fuer klin. Med.*, Vol. LXVI, p. 1, 1908-9.)

DUODENAL ULCER, WITH ILLUSTRATIVE CASES.

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The older textbooks and works on gastro-intestinal diseases treat the subject of duodenal ulcer very briefly; often the subject is dismissed with the single remark that if the pain of a gastric ulcer comes on several hours after the meal, the ulcer will probably be found in the duodenum. It is only in the last decade that the subject of duodenal ulcer has really been worked up; and only after the writings of Moynihan, the Mayo brothers, and other surgeons had shown the relative frequency of this condition did the internist wake up to the fact that possibly some of his cases of inveterate, relapsing 'hyperacidity' and other gastric neuroses were in reality due to ulcerative conditions of the duodenum.

We know relatively little of the etiology of this interesting condition. It frequently develops after extensive burns of the skin and in uremic conditions, but probably the great majority of the ulcers that we meet clinically are the result of a toxemia which is in all probability of gastro-enteric origin. There is certainly some close connection between disease of the appendix and ulcer of the duodenum, as in more than 75 per cent. of the cases of ulcer are found lesions of the appendix. It is even probable that disease of the appendix, in a way, causes ulcer of the duodenum.

In regard to the pathology, it may be said that the first part of the duodenum is usually affected, and while the ulcers are usually single, they may be multiple. They often penetrate deeply and present a punched out appearance, and not infrequently corrode vessels of considerable size and give rise to severe hemorrhage or even perforate and cause general or localized peritonitis. It is interesting to note, in passing, that the subsiding of active symptoms does not denote that the ulcer is healing; indeed, the ulcer may be progressing in spite of the fact that the patient's symptoms are receding and that occult blood has disappeared from the stool. Healing and the resulting scar formation may and often does give rise to cicatricial obstruction of the duodenum.

The first symptoms usually make their appearance during the second or third decade, and men are attacked two or three times as often as women. Early in the course of the disease the patients complain of bloating, heartburn, and a soreness in the epigastrium coming on soon after eating and usually relieved by belching. Later, however, the pains come on at about 11 a. m. and between 4 and 5 p. m., and frequently awaken the patient during the night. This so-called 'hunger pain' coming on when the stomach is empty is frequently described as a gnawing in

the epigastrium or a boring, burning pain which frequently radiates around to the right side or through to the back; and almost invariably, at least in the earlier stages, it is relieved by the ingestion of food, or of an alkali (baking soda). Often a glass of water suffices to relieve the pain for a while and one often finds that these patients carry a vial of baking soda or a cracker about with them in order to obtain relief by taking either if the pain comes on.

The appetite is usually good, although patients often state that they feel less uncomfortable if they do not eat too much at a time. There is usually but little nausea or vomiting, at least not until the last stages where cicatricial stenoses of the duodenum may lead to retention vomiting.

The physical examination is often entirely negative, although at the time of the pain there may be a slight rigidity of the right upper quadrant. Titration of the stomach contents obtained after a test breakfast shows a hyperacidity in about half the cases, at least during the periods of exacerbation. Quite frequently, however, the acidity is normal, or even less than normal. The motility is usually good, although the quantity of chyme obtained after a test meal is often rather more than normal. The contents are usually quite thin, an increase of gastric mucus being rather rare.

X-ray examination shows a hyperactivity of the pyloric portion of the stomach, the bismuth meal passing through the pylorus with unusual celerity. Often, however, there is an unusual pouching of the first part of the duodenum and a delay of the bismuth in this portion.

In general, it may be said that the diagnosis rests more upon the history than upon the results of the examination; indeed, Moynihan says: "These symptoms, so perfectly characteristic of duodenal ulcer, may be present for years without producing physical signs. It is therefore not necessary to the attaining of an accurate diagnosis that any examination be made. The anamnesis is everything, the examination is nothing. There is, in the stage when the presence of the ulcer should be recognized, no single physical sign indicating the presence of organic disease. Signs which confirm the accuracy of the diagnosis may appear later, but it is not necessary to await their arrival."

Later, however, he says: "In all cases of duodenal ulcer a test breakfast should be given. . . . Severe recurrent hyperacidity is duodenal ulcer."

Moynihan has been severely criticised on account of the above paragraph, but the writer takes it that he does not mean for a physician to neglect the physical examination of his patient, but rather that he means to emphasize that the very absence of physical signs in a way confirms the suspicion of duodenal ulcer.

Duodenal ulcer is a very chronic disease, cases lasting five or ten years being quite ordinary, while some of twenty or thirty years' standing have been reported. Its course is unusually vacillating; periods of pain, belch-

ing and 'acid dyspepsia' lasting weeks or months, being followed by months of entire freedom from symptoms. The exacerbations are prone to occur in the colder seasons of the year, so that many patients trace their symptoms to taking cold, getting the feet wet or other exposure. Worry and business or other cares, too, often seem to bring on an attack, and frequently a vacation will at once cut short a period of exacerbation.

Hemorrhage, either hematemesis or tarry stools, occurs in 35 to 40 per cent. of the cases. Occult blood will probably be found in the stools in almost all cases if sought for long enough. While the presence of occult blood in a way helps to clinch the diagnosis of duodenal ulcer, it is equally certain that its absence, even after repeated examination, in no way disproves the presence of an active ulcer.

Perforation, sometimes limited by adhesions, often, however, into the general peritoneal cavity, is not especially rare, but cancer, which not infrequently develops at the site of gastric ulcers, is almost unknown in the duodenum.

The prognosis is always serious in this disease; there is always danger of hemorrhage or perforation; while even if the acute symptoms subside there is a very great probability of a recurrence, especially in the chronic cases.

Treatment.—Little can be done in the way of prophylaxis, except possibly to operate early for appendicitis. In recent cases an ulcer cure, in the manner which is followed in gastric ulcer, is certainly worth a trial, but in the chronic relapsing cases operation undoubtedly gives the best results. Where feasible, excision will probably be indicated, but in the great majority of cases gastro-enterostomy with, perhaps, infolding of the ulcer and removal of the appendix is probably the operation of choice. Moynihan reports a mortality of 1.3 per cent. in 361 cases with cure or very great improvement in 80 to 90 per cent. of his cases. It must not be forgotten, however, that the operation does not end the treatment; it should be followed by careful dieting at least for a period of four to six months.

The following case histories will serve to illustrate some phases of this interesting disease. The family and previous history is not of any importance in any of the cases.

CASE I.—W. G., *et.* fifty-four, merchant, came under observation on August 25th, 1912. He stated that he had had stomach trouble off and on for thirty years, that he usually had two or three attacks of 'acid dyspepsia' a year, and that his stomach was in fairly good shape in the interim. His present attack began, about a year before he came under observation, with loss of appetite and pain in the epigastrium a little to the right of the median line, coming on usually about two hours after meals and often awaking him at night. The ingestion of food or baking soda always allayed the pain for a while. He vomited only very rarely, but said that vomiting gave immediate relief from the pain. He had lost 25 lb. in weight since the onset of his present attack, which he said was in every way similar to his previous spells but very much more severe and more protracted. He gave a doubtful history of having vomited blood and having had tarry stools some years ago.

The physical examination was quite negative, there being no tenderness anywhere. The stomach tube introduced one hour after an Ewald test breakfast showed 450 c.cm. of thin contents, somewhat bile-stained, total acidity 58 and free hydrochloric 52; no lactic acid, no Boas-Oppler bacilli or sarcinae; no occult blood. Two days later a repetition of the test showed 510 c.cm. of rather thin contents, total acidity 78, free HCl 63. Examination of the stool showed the presence of occult blood. A diagnosis of duodenal ulcer with probable obstruction was made, and on September 15th, 1912, Dr. H. L. Nietert operated, finding an ulcer $\frac{3}{4}$ in. in diameter on the anterior wall of the duodenum about 3 in. below the pylorus. There were quite a few firm adhesions between the duodenum and the gall-bladder; these were not disturbed and a posterior gastro-enterostomy was made in the usual manner. He made an uneventful recovery, and on January 21st wrote that he never felt better in his life, that he did not notice anything of his former ailment, and that his digestion was perfect.

CASE II.—W. M., *at.* forty-five, collector; came under observation on August 16th, 1911. He said he had had pain coming on two or three hours after meals for the past six months, but that the trouble was apparently growing worse; that he had lost about 10 lb., and that he was growing nervous and unable to sleep. The ingestion of food or baking soda usually relieved the pain for a while. He belched some, had never vomited, and had no history of hematemesis or tarry stool.

The physical examination was negative, there was no special tenderness in the epigastrium or at McBurney's point. The stomach tube introduced one hour after an Ewald test breakfast showed 90 c.cm. of thin greenish contents. Total acidity 83; free HCl 72; no lactic acid and no blood. The stool showed no occult blood.

He was treated by diet, alkalies and atropine, and improved and felt quite well for six weeks. A test breakfast removed at this time showed 30 c.cm. of contents; total acidity 34 and free HCl 22. Stool: no occult blood on two examinations.

Three months later he returned, complaining of belching and pain coming on when the stomach was empty. His condition grew rather worse, and after three weeks he consented to go to bed for an ulcer cure. He improved under this regime and felt quite well for a period of two months. He was kept on a rigid diet, but, in spite of this, the old symptoms returned eight weeks after the completion of the ulcer cure. He grew worse so rapidly that he finally consented to an operation.

Dr. John McH. Dean operated June 15th, 1912, that is about ten months after first coming under observation, and found an ulcer about $\frac{1}{2}$ in. in diameter some 2 in. below the pylorus. There were quite a few adhesions in the neighborhood of the duodenum and the gall-bladder, which were loosened up. An old adherent appendix was removed as was also Meckel's diverticulum which was about 8 in. long. A posterior gastro-enterostomy was then performed and the patient made a good recovery. He has been kept on a rigid diet and has picked up in weight and is in good shape now—seven months after operation.

CASE III.—J. R. B., *at.* twenty-seven, shoe-cutter, had had stomach trouble for three years before coming under observation. He had pain in the epigastrium coming on at about 11 a. m. and at about 4 p. m. At first the pains were relieved by the ingestion of food or by soda, but lately these have failed to give relief. He was occasionally awakened during the night by hunger pains. There was very little nausea, no vomiting, but quite a bit of belching and heartburn. He said that he had weeks of comparative comfort, but that the attacks always recurred in exactly the same manner as the preceding ones. He had lost 15 lb. in weight during the year preceding the examination.

Physical examination was entirely negative. The stomach tube showed 180 c.cm. of thin contents, one hour after taking an Ewald breakfast. Total acidity 56, free HCl 40, no lactic acid; no Boas-Oppler bacilli; no occult blood. Stool: no occult blood (only one examination).

Dr. R. F. Amyx opened the abdomen on October 5th, 1912, and found an ulcer about 1 in. beyond the pylorus. The floor of the ulcer was very thin, giving one the impression that it was about to perforate. Dr. Amyx sewed the ulcer over and applied an omental graft to it and did a posterior gastro-enterostomy. An adherent appendix was removed at the same time. The patient made an uneventful recovery and is in excellent shape at the present time.

CASE IV.—W. G., *æt.* forty-six, merchant; came under observation July 8th, 1909. He said he had had indigestion for years with occasional spells of vomiting coming on three or four hours after the meals, as a rule. There was also quite a bit of belching and a little tenderness in the right upper quadrant. A test breakfast removed at this time showed 180 c.cm. of contents, rather thin in consistency; total acidity 113, free HCl 67; no lactic acid; no Boas-Oppler bacilli, no sarcinæ.

He was placed on a diet and given medicines to correct his hyperacidity, and improved very promptly and remained in good shape for four months, at which time he again complained of belching, heavy feeling in the epigastrium, and occasional pain coming on several hours after the ingestion of food. Again he improved under dietary and medicinal treatment, and remained fairly well for a period of nine months, when the old symptoms returned. This exacerbation did not yield as promptly as the others had, but, at the end of two months, he was once again fairly comfortable. This remission lasted only two months, after which he had a short spell and then again a period of comfort lasting seven months. After this remission came a rather severe exacerbation during which he vomited blood on two occasions. He was put to bed and given a Leube ulcer cure at this time, and improved and remained in good condition for four months when he had a short relapse followed by a period of comparative comfort lasting up to the present time—somewhat over six months. He is sensitive to pressure at times in the region of the appendix and again in the gall-bladder region, while at other times there is absolutely no sensitiveness anywhere. He has had repeated test breakfasts which usually show from 75 to 150 c.cm. of contents of high acidity, and very little gastric mucus. Occult blood is occasionally present in the stool, although also very frequently absent.

The patient has not consented to operation up to the present, but the diagnosis is quite clear. It shows the chronic remittent course of the disease very nicely.

CASE V.—L. S., *æt.* forty-eight, fireman, was seen in consultation with Dr. W. H. Carruthers on June 16th, 1912, on account of severe vomiting of blood and bloody stools. The patient was an unusually well-developed man who had had stomach trouble—namely, hunger pain coming on several hours after the meals, pains awaking him at night, belching and bloating for the past two years. On May 27th, about three weeks before the writer's first visit, he vomited blood, "about a cupful," and on June 11th, he vomited "a quart of blood," so he said. Since that time he had vomited blood almost every day and his stools had been tarry every since the first hematemesis.

He complained of weakness and of vertigo; was very anemic, and had a slight pain in the epigastrium. There was no special tenderness anywhere. He was taken to St. Anthony's Hospital, and fed per rectum, all food per os being withheld; he seemed to improve for three days and then had another severe hemorrhage, after which the stools continued to consist almost of pure blood, and he vomited blood several times a day. On the fifth day after coming to the

hospital his hemoglobin was 35 per cent. (Dare), and his pulse 110 and quite weak. Soon after seeing patient that day, the Sister telephoned that he had had another severe hemorrhage and that she thought he was dying.

It seemed at that time that he would surely die of hemorrhage unless something radical was done, and it was, therefore, decided to operate the following morning. He seemed almost in extremis the next morning, but nevertheless Dr. Nietert opened the abdomen and found many adhesions in the region of the duodenum. These were not disturbed, but a rapid posterior gastro-enterostomy was made, and the patient was returned to bed and restoratives applied. He reacted well, the vomiting ceased, and soon the stools became free of blood and he made a good, although somewhat tedious recovery, and felt quite well for six months. Repeated examinations of the stools failed to show any occult blood during this time, but some three weeks ago he had another spell of vertigo and his stool was found full of blood. Rest in bed and liquid diet sufficed to stop the bleeding, and he now feels quite well again. It is interesting to speculate as to the source of this last hemorrhage, whether it came from the original ulcer or whether possibly a new ulcer had formed in the jejunum, as sometimes occurs after a gastro-enterostomy.

The writer does not wish to have it inferred that operation is the only way of stopping a bleeding from a duodenal ulcer; the great majority of such bleedings either cease spontaneously or stop after the patient has been placed in bed and fed per rectum, but he does think that in certain cases where these measures fail, operation and more particularly gastro-enterostomy may prove life-saving as in the case just cited.

CASE VI.—C. U., *æt.* fifty-four, clerk, was seen in consultation with Dr. H. Hanser on September 15th, 1912. He said he had had stomach trouble for about two years. Although quite intelligent, he seemed to have been a very poor observer or to lack the power of expression, at any rate his history was almost worthless when we attempted to get at the details of his stomach trouble. About six weeks before the writer's first visit he took sick rather suddenly with acute pains in the right upper quadrant, followed by slight collapse, some rigidity, and absolute constipation lasting three days. Operation was refused, but after three days his bowels moved and he felt better from day to day. Since that time, however, he had continuous fever ranging from 100° to 103° F. with occasional slight chills, but no sweats. He had no special pain anywhere, although at times there seemed to be a little rigidity on the right side near the umbilicus. He had very little appetite, seemed apathetic, although not at all like a typhoid. The Widal test was negative, and the leucocytes were usually about 12,000. It was thought at this time that he had probably had a peritonitis and that he had a small suppurative focus somewhere in the abdominal cavity; but, as he seemed to be improving, it was thought best to await developments. He continued to improve slowly, although never free of fever, and after a week or so was able to sit up in a chair. Then suddenly, about three weeks after the writer's first visit, he was seized with a very severe pain in the region of the epigastrium, vomited and had board-like rigidity of the upper abdomen. A diagnosis of perforative peritonitis was made, and the patient was taken to the hospital where Dr. Robert E. Schlueter operated upon him and found a mass of adhesions in the gall-bladder region and a large mass behind the stomach. This was explored as well as the patient's condition permitted, and a posterior gastro-enterostomy was then made and the gall-bladder, which by the way contained no stones, drained. Four days later the patient died, and

the autopsy showed a perforating duodenal ulcer on the posterior wall of the duodenum and quite a large abscess lying behind the stomach and after a fashion draining into the duodenum. Evidently, the patient's first attack was due to a perforation and his continuous fever to a small abscess cavity in the lesser peritoneal cavity.

CONCLUSIONS.

1. That the 'stomach trouble' lasting for years with hunger pains relieved by the ingestion of food or soda, with severe exacerbations followed by periods of almost complete freedom from discomfort, almost always indicates duodenal ulcer.

2. That duodenal ulcer is relatively not an infrequent disease and that in many cases its symptomatology is quite clear and its diagnosis easy.

3. That Moynihan's dictum "severe recurrent hyperchlorhydria is duodenal ulcer" is probably nearly true.

4. That the danger of hemorrhage and of perforation, and the frequently resulting cicatricial stenosis after the ulcer itself has healed, makes duodenal ulcer a serious disease which should be treated vigorously,—in recent cases by medical means and diet and by surgical measures in chronic cases.

626 Metropolitan Bldg.

THE IODINE TREATMENT OF GONORRHEA IN THE FEMALE.

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City, Mo.

The frequency with which gonorrhea occurs, the disastrous results often following the infection, the tendency of the general practitioner to overlook the specific cause in women who come to him suffering from an irritating vaginal discharge, justifies, the writer believes, the publication of this article.

It is the writer's opinion, following close observation, that women of the upper classes are more prone to the remote results of gonorrheal invasion, such as salpingitis, pyosalpinx and pelvic abscess, than are her sisters of the lower classes—namely, those that present themselves at the clinics for diagnosis and treatment.

Timidity on the part of the physician oftentimes precludes a vaginal examination; at other times carelessness is the cause of an oversight; and still another most deplorable circumstance is when the attendant is imbued with the idea that because his patient is either of high social standing or possessed of wealth it is impossible for her to be a sufferer from gonorrhea. The falsity of this latter idea is apparent to all who do any extensive gynecological work.

Etiology.—In brief, the specific coccus of Neisser.

Mode of Infection.—In the great majority of cases it is acquired through sexual intercourse either legitimately or illicitly. Occasionally infection may take place through the use of towels, a contaminated douche-nozzle or very rarely the toilet seat, and even by instrumentation in the hands of careless attendants or physicians.

In the young married woman, if innocently acquired, it generally takes place during the first week or two of the honeymoon, if not then, it usually is a good criterion as to the Neisser-free condition of the husband's genitalia.

The frequent and burning urination as well as the dry, hot sensation in the vulva and vagina of the newly married woman, after the first few days, is in reality the initial infection, although the symptoms are attributed to the existing situation. Proper treatment instituted at this early stage of the disease would be the means of avoiding years of invalidism in the unsuspecting victim.

It is deplorable how many innocent women are really innocently infected, that is, the male enters the matrimonial state fully convinced that he will not subject his prospective wife to any risk, simply because there are no longer any gross manifestations of the gonorrhea that he may have contracted years ago.

Inasmuch as it is so essential to ascertain the possibility of a complete cure in the male before allowing him to marry where gonorrhea has existed (as a prophylactic to the female), the writer will digress somewhat from the title and call attention to what should be done by every physician consulted for an opinion as to the advisability of an individual getting married once he has had gonorrhea.

If a patient presents himself for an examination to determine whether he is marriageable or not, when there is no apparent discharge and no urinary shreds noticeable even after frequent and repeated examinations by the microscope of the centrifuged urine, we should not be content to pronounce him negative to gonococci.

In such cases it becomes essential to have the patient come to the office or the hospital with a bladder containing urine. The patient is placed in the proper position and the prostate as well as the vesiculæ seminales are extensively and thoroughly massaged. Five minutes after the massage the patient is instructed to void his urine completely into a suitable receptacle. A portion of this is then centrifuged for fifteen minutes, the sediment placed on a slide, fixed, and properly stained for the gonococci. If none are found in the first specimen it is well worth the while to centrifuge the whole of the remaining urine and repeat the examination.

If after a careful examination no gonococci are found, then it behooves the physician to institute the complement fixation test. A negative blood test plus the negative findings in the urine then permits us to venture a frank opinion in the case, and the patient may feel assured that he will not infect his future wife. If it should happen that the patient has recently received a course of vaccine treatment for his gonorrhea, then it becomes necessary to postpone the complement fixation test for several weeks. After a recent vaccine treatment, it sometimes happens that the test shows positive for the gonococcus when really gonorrhea is no longer present.

Symptoms.—If the case be one due to illegitimate intercourse the symptoms usually follow shortly after such an act; if otherwise acquired it may be impossible to estimate the time of infection.

The patient first complains of slight burning on urinating, increasing in intensity and frequency; at the same time or shortly after urethral symptoms appear and there is a feeling of heaviness as well as a hot burning uncomfortable sensation in the vulva and vagina, which is soon followed by a purulent leucorrheal discharge and a mild or more marked degree of pruritis vulvæ. These symptoms may increase or decrease in

severity after the first few days. If the disease progresses the cocci invade the cervix, which condition is practically symptomless so far as the patient is concerned. Following the invasion of the cervix, involvement of the uterus is usually manifested by a slight rigor and malaise followed by a sudden dull ache and sensation of weight in the lower central pelvic region, an increase in the discharge, and marked local tenderness of the uterus on bimanual examination.

The infection may remain limited thus far for a variable period, but should the tubes become involved, which frequently takes place during or following a menstrual period, the symptoms at once become those of a pelvioperitonitis either mild or severe according to the extent of the involvement. It seems superfluous to elaborate on the symptomatology, inasmuch as the symptom-complex is only too well known to all practitioners.

Pathology.—Both the vagina and urethra are the primary site of the gonorrheal infection following intercourse. The length of time that the infection remains localized to these parts is variable. Further involvement may take place. It may proceed at once into the uterus through a patulous cervix, it may require a long time to reach the endometrium, or it may never enter.

Under favorable conditions, soon after the gonococci are deposited, they penetrate the epithelial layers. Fortunately the connective-tissue of the mucous membrane in a large percentage of cases seems to act as a barrier, and further penetration does not occur readily, although it is by no means limited, for the specific coccus has been found in the sub-mucous tissues of the vagina, in the squamous epithelium, in thrombosed blood-vessels of the bladder, in the serosa of the peritoneum, and in the substance of the ovary; also in the connective-tissue of the Fallopian tubes, in the rectal mucous membrane, and in the uterine muscle.

The upper layers are infiltrated with round cells which penetrate and loosen the surface layer of epithelia, desquamation ensues, and many pus cells are present on the surface as well as many groups of gonococci.

Were it true that the gonococci readily penetrated the denser connective-tissue and muscle, the local treatment of gonorrhea by medication would be absolutely of no avail.

The end result of a neglected chronic infection is that of an endometritis in the vast majority of cases. Frequently there is no evidence of any existing gonococci.

Treatment.—Acute gonorrhea in the female, is, the writer believes, more readily combated than in the male. The urethra, aside from Skene's glands, is not obstinate to treatment, and the vagina is easy of access and not nearly as sensitive as the male urethra.

Skene's glands, as well as the vulvovaginal glands, are not to be overlooked; in fact, it is to those structures that particular attention must be given if the treatment shall prove successful. The gonococci seem to

show a predilection to implant themselves, so to speak, in the above named glands, and the minuteness of the external openings has a tendency to allow the physician to disregard them, and if properly treated it is both difficult and tedious to do so. The technique for the proper treatment will be given in detail below.

So long as the infection is limited to the vagina, urethra, Skene's glands and the Bartholin's or vulvovaginal glands (not necessarily the latter), it is by no means indicated to tamper with the cervical canal. If no infection is present then no good can be accomplished by introducing into the os swabs with different antiseptic solutions. Harm alone can result from such a procedure. The practice of tampering is just as pernicious as that of the surgeon, who, after a laparotomy, removes the dressings from the healing wound, finds it perfectly aseptic, and at once begins to wash with sterile water and gauze the surrounding skin and site of the incision.

Following the suggestion of Bovée, of Washington, the writer has in the past months used the iodine treatment for gonorrhea with excellent results, both in his gynecological clinic at the University Medical College and in private work.

Acute cases before the end of a week or ten days are not frequently seen, for free advice is generally given by friends. A certain percentage, nevertheless, present themselves for examination after the first manifestations, and it is in those cases that a speedy cure oftentimes follows a thorough systematic treatment.

The first thing to do is to ascertain the presence of the gonococcus in the discharges. This is done by first taking a smear from the urethra and Skene's glands on one slide, and then separating the vagina; several smears from the latter are taken. These are at once fixed and stained properly, and microscopically examined for the presence of the Neisser diplococcus.

In private practice the patient has taken a douche, as a rule, immediately preceding her arrival at the office, which fact may at times lead to an erroneous diagnosis because of an inability to find the offending organism. If this be the case, the patient should be instructed to return the following day without taking a douche beforehand. Even though the douche has been used, at times the nature of the infection can be diagnosed from smears of the urethra and Skene's glands. Having ascertained the nature and the apparent involvement of the infection, treatment is begun.

Place the patient in the dorsal position as for ordinary vaginal examination; separate the labia with thumb and index finger of left hand, exposing the vestibule, clitoris, and meatus urinarius; swab the parts thus exposed and also the labia minora and inner surfaces of the labia majora with a solution of 3.5 per cent. iodine crystals in 95 per cent. alcohol. Next search for the orifices of Skene's glands, force a few drops of the

same solution by means of an ordinary hypodermic syringe to which is attached a needle made blunt by filing. The writer prefers a Gottheil syringe with a long blunt needle, as it is somewhat more convenient to handle. Next search for the external openings of the vulvovaginal glands and repeat the injection as above. The writer has not found it necessary to treat the urethra directly except in isolated instances.

The patient is now placed in the Sims' position, and Sims' speculum introduced, the vagina swabbed dry with cotton, and the presenting cervix (not the canal) is painted thoroughly with the iodine solution by means of a cotton swab about the size of a hickory nut firmly fastened in the ordinary dressing forceps.

The anterior wall is thoroughly painted, then both the right and left sides. Now press the swab firmly up into the posterior cul-de-sac, partly withdraw the speculum, rotate it so that it will press against the anterior vaginal wall, and then reintroduce as far as possible, swab the posterior wall, and remove the swab. Next introduce a real narrow strip of gauze as high up against the posterior wall as possible, remove the speculum and allow the gauze to protrude beyond the introitus. If a bivalve speculum is used, patient in the dorsal position, it becomes necessary to swab the vagina in smaller sections, that is on either side where the separation of the blades allows of the exposure of the walls. After swabbing both exposed areas the speculum is partly closed and rotated sufficiently to expose two new areas, and so on until the whole vagina has been painted. The swab is then firmly pressed into the posterior cul-de-sac, the speculum withdrawn, the vaginal walls allowed to collapse, and the swab is slowly removed with a rotary motion thus insuring a complete and thorough application to the tissues. A small piece of gauze is then introduced as before.

The patient is prone to complain of considerable smarting and burning for half an hour or so, but rarely any longer. The writer has seen some patients that seemed to experience no inconvenience whatever. The actual urethra as a rule requires no special treatment locally. Doses of 5 to 7½ gr. of urotropin are given four times daily with plenty of water. The patient is ordered to rest as much as possible, and where it is possible she is kept in bed and a light diet is insisted upon; alcoholic beverages are prohibited as well as both tea and coffee. The bowels are kept free by means of cathartics; never use an enema, for its use enhances the possibility of a rectal infection. When dealing with a protracted case where the cervix and uterus have become involved, the treatment becomes more difficult and more tedious. In making the intra-cervical and intra-uterine applications, it is preferable to have the patient in the dorsal position and to use the bivalve speculum. First paint the cervix with the iodine solution, then grasp the anterior cervical lip with a single vulsellum forceps, remove any stringy discharge and gently introduce a small uterine sound, if the size of the canal demands it; other-

wise dilatation should be rigidly avoided. After a careful dilatation the intra-uterine syringe is introduced into the cavity of the uterus as high up as the fundus, then gently instill a drachm of the iodine solution; do not use any force on the piston of the syringe. Slowly withdraw, but all the while allow the solution to escape from the syringe until the tip presents at the external os. The vagina is then treated as in acute cases.

The writer has never felt justified to use sufficient force behind the injection so as to force the iodine into the Fallopian tubes, being fearful of the possible results should it escape into the peritoneal cavity.

The applications are repeated every third day both in the acute and chronic forms of the disease. Two days after the third application smears are again taken, for microscopical examination, from all the different structures involved. If the gonococci are still present, the treatments are continued, and in addition the vaccine treatment is begun. The writer wishes to make the remark that large doses at short intervals are valuable.

If the urethra proper requires any direct local treatment, the applications should be preceded by cocainization.

In all cases hot douches are ordered to be taken in the recumbent position with hips elevated. From four to six quarts of hot normal salt solution, as a douche, twice to four times daily, each followed by a one quart injection of permanganate of potassium solution 1-5000 or picric acid 1-250.

The patient is instructed to remove the gauze drain at the time of the first douche, which should be taken about four hours after the local treatment.

The uniformly encouraging results and the rapidity of some of the cures with the iodine treatment have prompted this article.

The writer feels very much opposed to curettage in obstinate cases of gonorrheal endometritis where gonococci can still be demonstrated; in fact, it is his opinion that it is never justified. Some men, of wide experience advocate its employment, while others with equal experience oppose it. Hence, it must still be regarded as a disputed point and more or less a matter of choice; but the fact remains that in certain cases annoying complications have followed a curettage, a fact that should suffice to make us cautious.

When the condition has reverted, so to speak, into a simple chronic hypertrophic or fungous endometritis, minus the gonococcus, then local applications become useless, and it is then a curettage is done as the only means to benefit the patient. The failure of the uterine discharge to cease after the operation is simply due to faulty technique.

The writer is frank to admit that a perfect curettage is by no means an operation to be made light of, and he considers it the most difficult in the domain of gynecological operations. Those, who have ever had the opportunity of examining the inside of a uterus (which has been curetted

previously by a competent operator) either post-mortem or at a later hysterectomy, will be amazed to see the numerous patches of undisturbed endometrium that the skilfully handled curette did not reach. The reason for this digression is to remind us that we should in no case expect too brilliant a result from a curettage.

1030 Rialto Bldg.

A NEW PESSARY.

By WALTER R. HEWITT, M. D., of St. Louis.

There are numbers of good pessaries on the market which are serviceable in a variety of conditions, yet even the Menge and Gehrung pessaries fail to meet all emergencies; hence, the writer has devised a pessary to alleviate those annoying disturbances in which complete prolapse of the uterus must be combated as well as cystocele and rectocele which so often accompany the prolapse.



Fig. 1.

Briefly, the principle of the writer's pessary is to utilize the pubic arch and rami and the remnant of the pelvic floor usually present in cystocele and cases of prolapse, the result being a 'plug effect,' which, on account of the device being an air and soft rubber one, exerts uniform pressure on all sides (Fig. 1).

The pessary being made of three rubber rings of various and increasing sizes, with the base the largest, the bladder and rectum cannot get around the plug and the smaller inflated ring holds the cervix up. The length of the three-ring-shaped pessary, as well as the irregular mouldings which afford a 'grip' for the muscles, prevents its turning while in the vagina (Figs. 2 and 3). The external opening will permit of the escape of discharges, and douches can be taken in certain cases even when the

peessary is in place. When a case is properly selected and fitted, the patient feels perfectly comfortable even though the pessary has a rubber core that is less resilient than the outer wall. In the manufacture of this pessary, the writer desired to have it made so that it could be inflated with a Politzer bag, but this was not practical, as moulds are used in its manufacture. The pessary, upon section and examination, is found to contain three patent valves—one for each ring and well separated from each other (Fig. 4). There are various sizes of the pessary.

The pessary is easily inserted provided it is thoroughly coated with glycerine and grasped firmly with the whole hand, squeezed together and then the first ring pushed down and backwards toward the rectum as it enters the vagina. When in place it will be found to be held by Nature's supports. As a warning, the writer wishes to emphasize the importance of not using vaseline, as it destroys the rubber very quickly. In the beginning the large size, and after a few weeks the smallest size which will do the work, should be used. Remember that if your patient

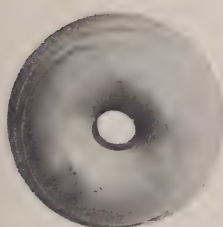


Fig. 2.

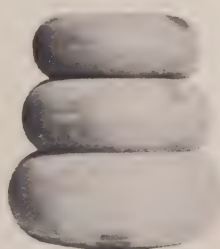


Fig. 3.



Fig. 4.

is properly fitted she should not be conscious of the presence of the pessary and should be free from any pain.

As to the removal of the pessary, it is important to remember that it should be removed every two to four weeks and carefully cleansed. In one of the writer's cases, the patient removes the pessary herself, about every two to three weeks, cleanses it and reinserts it. She has been doing this for over a year and the result is ideal.

An objection that plugs interfere with sexual intercourse may be raised, but this can be set aside when one recalls that this pessary is not to be used in operative cases. Therefore, it is of value in old women, bad operative risks where heart lesions or severe nephritis with high blood-pressure exist, and as a palliative measure. One can readily see that it is frequently a boon to old women with rapidly failing health, and where temporary measures only are advisable.

The writer has used this pessary in some 12 cases. In one case it failed owing to hypersensitiveness of the scar-tissue.

The following case will illustrate the good points of the pessary:—

Mrs. C., *et.* thirty-five, mother of three children, one nursing. Patient had had a severe attack of hay fever; was very nervous and very irritable when

seen by the writer. Had enormous cystocele, probably two-thirds of the bladder protruding; there was frequent urination and she was obstinately constipated; also had a moderate tear of perineum and rectocele; to use her own words she felt "miserable." On September 15th, 1912, an air and soft rubber pessary was inserted and relief was immediate. Frequent urination ceased, bowels became regular, and in two weeks she had gained 8 lb. and was not nervous. A perfect result was obtained, although only a palliative measure in this case.

As regards the benefit which results in the treatment of aged women, the case reported to the writer by Dr. W. C. Gayler, of St. Louis, should suffice.

Mrs. J., *et. seventy-one*, mother of nine children; first child born fifty years ago, last thirty years ago; cystocele for fifty years when perineum was torn; since then she has suffered from numerous attacks of involuntary urination, and backache. She also has had attacks of constipation, followed by diarrhea. There was complete prolapse of uterus, the cervix protruding beyond the vulva for ten years. "For two years various pessaries and other mechanical supports were used with absolute failure." On June 25th, 1913, the writer's pessary was inserted, and resulted in an amelioration of all the symptoms, as the uterus was well held up in position. Though only in use about one month, the patient is much more comfortable, as she has been free from backache and bladder symptoms the first time in fifty years. To date she has had no trouble with her bowels.

The writer's best results have been in cases where there has been very little perineum.

5212 Delmar Ave.

MEDICAL SCHOOL INSPECTION.

By FRANK ALLPORT, M. D., of Chicago.

CONCLUSION.

SECTION IV.

It should not be forgotten, that the hygienic and medical supervision of schools may be participated in both by the Boards of Health and Boards of Education; the former to be particularly and authoritatively interested in those phases of health problems, which affect the public health, such as contagious diseases, unsafe school buildings, etc., while the latter may take in hand the physical defects of children, such as eye, ear, nose and throat diseases, nervous and mental conditions, etc. It is probably the consensus of opinion that in a broad, general way the medical inspection of schools, excepting those physical conditions which menace the public health, is best carried on by the educational rather than by the health authorities. It seems better that such matters be controlled by the various local boards of education. It gives a greater freedom of action than could be obtained in any other way. Of course, the educational authorities should work in thorough harmony with the health authorities, and all health laws should be absolutely observed. Reciprocity between the two bodies should be extended, and it is especially important that neighborhoods, where contagious diseases have broken out, should be instantly reported by the Board of Health to the school authorities so that suspected scholars may be suspended from school, and thus materially mitigate the frequency and potency of school epidemics.

In all fairness it should, however, be said that a committee, appointed by the American Public Health Association in 1911, gives it as their opinion that all health matters in public school-children should be under the jurisdiction of the Department of Health, and not under the Department of Education. So it seems, there is a discrepancy of opinion amongst competent advisers. At all events, the writer thinks he may say, without fear of contradiction, that the main thing is to do the work. However it is done, let it be done and done at once.

However medical inspection is performed, one of its chief functions should be the education of children and their parents along the lines of personal and home cleanliness, and hygiene. It should not be theoretical, nor statistical, but intensely practical. A real hunt for diseased and unhealthy conditions should be constantly made, and when such conditions

are found an earnest and unremitting effort should be made for their extermination.

If we glance at the history of this movement we find that in France, as early as 1833, the rudiments of school hygiene were begun. These were gradually evolved into a comprehensive medical and sanitary inspection which was made obligatory in all schools, both public and private in 1886. The movement was spreading simultaneously over other European countries and reached a definite, organized system in Belgium in 1874, in Germany in 1889, in Hungary in 1887, in Norway in 1891, in Sweden in 1878, in Roumania in 1899, and in many other countries. England has had a National Medical Inspection Act since 1908. Modern systems have been in operation in Chile since 1888, and a most thorough system in Japan since 1898.

In the United States medical inspection has been largely a matter of municipal authorization. The first medical inspector was Dr. Morse, of New York City, who was appointed in 1892. Boston established a regular system in 1894, under Dr. S. H. Durgin, Chicago in 1895, Philadelphia in 1898, and so it was spread to many cities. Several states have passed statutes making medical inspection compulsory.

In 1900 medical inspection of schools only existed in 8 cities in the United States, but from them the work spread rapidly and now very good work is done in from 400 to 500 cities. The writer will state further that in 1900, no city in this country had school-nurses, and now nearly 100 cities make use of them. Still further it may be said that nearly 75 cities employ staffs of school dentists.

It will thus be seen that certainly in point of time, at least, the United States has been far behind the times in the matter of medical school inspection, for from the time this movement began in France in 1833, in England in 1843, and in Germany, Hungary, Norway, Egypt, South America, etc., a lapse of fifty years occurred in America, as it was not even begun until the year 1892 in New York City. This is not a record to be proud of, but perhaps we can now make up in energy and promptness what we have lost in time.

If medical inspectors are appointed at all they should be appointed with care and circumspection. The writer believes it is best that they should be appointed not only on account of their general character and fitness, but on account of having been selected by a competent board of examiners, partly educational and partly medical in its character, through the mediumship of a competitive examination. Civil service should prevail and a man should not be displaced, except for adequate cause. Politics should have nothing to do with the matter at all. Medical school inspection is required by law in twenty states and it is to be hoped that the day is not far distant when it will become a legal necessity in every state in the Union.

Medical inspectors should be men of age, judgment and experience,

who are interested (beyond a financial interest) in the scheme; nevertheless, they should be paid an adequate sum for their work; enough, in short, to attract good men. It is thought by those who have given such matters their earnest consideration, that doctors should never be paid less than \$900.00 a year, even if they only give up half their time to the work, and that \$1,000.00 is little enough for this work. Doctors who give all their time to the work should be paid at least \$3,000.00, and the chief medical inspector should not receive less than \$4,000.00 a year and \$5,000.00 would be none too much.

There should be a convenient central office for the chief inspector where he can transact his business, receive reports, examine special cases, see parents, teachers, etc. They should be vested with the authority, and the scholars, teachers, and principals and superintendents should understand that their opinions must be respected in all matters concerning the health of school children. This should refer not only to the health of the scholars, but to the healthy and hygienic conditions of the school buildings and grounds, whether already built or in projection. In small towns one inspector will be sufficient, but in larger cities many inspectors will be required, who should be under the direct supervision of a chief inspector to whom all reports should be made.

Each inspector should give a certain portion of his time each day to visiting the schools which are assigned to his district; the chief inspector should devote all his time to the work. Each child should be suitably examined once or twice a year by the inspector (in the presence of the parents, if they so desire); after which children who are suspected, by the inspector, teacher or school-nurse, of being diseased, should be examined and properly disposed of by the inspector at his daily school visit. Except in cases of emergency, the medical inspector should not treat the children attending schools under his supervision. This rule would, of course, have to be materially mitigated in small towns.

It must not be forgotten that medical school inspectors must not be too zealous in the discharge of what they conceive to be their duty. They must not unnecessarily trample upon the sensibilities of the public, and this means not only the public in general, but the children, and their parents in particular. Doctors who have perhaps been educated in Europe, and even in some medical schools and clinics of this country, have learned to disregard the sensibilities and modesty of those people submitted for examination. It should be a part of the Chief Inspector's business to see that not only the children are examined, etc., from time to time, but that the teachers and nurses are from time to time instructed in school hygiene and in the examination and observation of children as to their diseases, defects, habits, etc. This instruction should be in the form of practical lectures given by the Chief Inspector or his assistants.

However these views may work out in private practice, they certainly are unwelcome in school examinations. The writer understands that this

matter has created considerable acrimonious discussion in Newark, N. J., where the school inspectors have insisted upon a more or less nude condition of the body both in male and female scholars, especially in making heart and lung examinations. Such examinations should, of course, always be performed in private, and with the distinct consent of the parents; and, in fact, the writer greatly questions whether it would not be better to have such matters referred to the parents altogether, and the investigations continued by self-selected physicians. Certainly the time is not yet ripe for such work to be performed in the public schools. It is carrying the idea of medical school inspection too far, at least for the present. It should not be forgotten that medical school inspection is a comparatively new thing, it is but on trial, and its friends and advocates should be careful lest they bring discredit upon the system, and thus delay the progress which they righteously desire to encourage.

There seems to be no uniform idea as to the proportionate number of medical school inspectors which should be appointed in the various cities. Some cities employ an inspector for every 1,000 children, while other cities employ one for every 5,000 children. It may be said, the writer thinks truthfully, that one inspector cannot attend properly more than 3,000 children, and it would be better if he only attended 1,000 children, certainly not more than 1,500 children.

Before leaving the subject of the medical school inspection, the writer wishes to say that he is firmly convinced that instruction concerning sex hygiene should be given in our public schools to boys and girls of certain ages. A male physician should teach the boys and a female physician should teach the girls. It must, of course, be evident that a knowledge of such subjects is acquired by young people and usually in an undesirable and unfortunate manner. But few parents talk frankly with their children upon such subjects; and probably a majority of the parents of public school-children are incapable of imparting this information in a proper and beneficial manner. It can, therefore, be better taught under proper auspices in our public schools, after the manner so ably and thoughtfully described by Dr. Philip Zenner, of Cincinnati.

These are some of the duties of the medical inspector of schools, not all, by any means, but enough to give you an idea as to the general purpose of his work; and, of course, in a paper like this, which is supposed to be of a general character, we have not the time to dwell long upon any particular branch of this interesting subject.

In order that medical men may be intelligent on the important subject of school hygiene, and understand the duties of medical school inspectors should they be called upon to serve in this capacity, the writer would strongly urge that all medical schools should give suitable and thorough instruction on this vital topic.

As one argument showing the value of medical school inspection, it may be said that it has been estimated that in this country 11,000 people

(principally children) die annually of scarlet fever, 9,000 of measles, and 10,000 of pertussis. These percentages are always materially reduced in cities possessing adequate medical school inspection.

Dr. O. H. Hoag, of California, has devised a very ingenious plan for the examination of children by school-teachers, which he calls "Health Surveys." The teacher is provided with little printed books, and a book is assigned to each child.

The printed matter consists principally in questions concerning the child's health, with spaces for answers. The questions are so formed that the only answer required is of an affirmative or negative character, and a little space is provided where the teacher can make a mere mark of the pen in answer to the question. The questions are divided into sections referring to different parts of the body, and are all of a pertinent, leading and comprehensive character, which when completed and finished will give the teacher an intelligent idea as to the physical, mental and nervous condition of the child, which will be of great assistance to her in the management of the child, and a guide to her in offering advice as to what kind of medical counsel should be sought. These inquiries should be begun in the early autumn and continued somewhat leisurely until completed. The action concerning the child's abnormalities should be taken and followed up until all has been accomplished that is possible. To give an idea as to the character of the questions, the writer will say that one section is devoted to the "General Appearance of the Child," and under this heading will be found such questions as "Is the child healthy appearing?" "Are the shoulders even?" "Is the color good?" etc. Under "Nervous Conditions," will be found such questions as "Is the child good-tempered?" "Is he free from abnormal emotions?" etc. Under "Eye Conditions" will be found "Are the eyes free from redness and discharge?" "Are the eyes straight?" etc. Under "Skin Diseases" are the questions "Is the head free from signs of disease, such as lice, ringworms, etc.?" "Is the skin healthy looking?" It will thus be seen that while single questions of this nature are not always significant, the entire picture obtained by such a general survey will produce an intelligent idea as to the bodily condition of the child, and afford a reliable guide as to what steps should be taken.

Dr. Hoag obtained a year's leave of absence from the Leland Stanford University to go to Minnesota and undertake this work under the auspices of Dr. H. M. Bracken of the Minnesota State Board of Health. His headquarters are in St. Paul and he holds himself in readiness to do 'field work' in any part of the state. Various cities and towns request his presence to start a movement for the proper medical inspection of their schools. Dr. Hoag goes where he is called and stays there long enough to inaugurate the work, and to interest the teachers, doctors and nurses, as to the details; then he goes elsewhere and repeats the process. He teaches one of three plans, according to the size of the place and the desires of the authorities. The three plans are as follow:—

1. Organization with a medical officer and nurse, or nurses.
2. Organization with school-nurse or nurses only.
3. Organization by the employment of a simple non-medical health survey, on the part of the teachers only, such as has just been described.

The Minnesota State Board of Health maintains at the Capitol building, St. Paul, a clearing house of information concerning child hygiene, medical supervision, the teaching of school hygiene, sex hygiene, etc. 'Field work' like Dr. Hoag's or Professor W. H. Heck's of the University of Virginia, and others, is one of the most practically useful movements that can possibly be inaugurated for the physical welfare of school-children. In this way, an experienced man, devoting his time to a certain state, passes from town to town and comes into personal contact with health and educational bodies, and also with the doctors, the teachers and the children. He teaches them the evils of the common drinking cup and towel, the dangers of dry cleaning, unhealthy locations, poor ventilation; and the benefits of proper lighting, exercise, medical inspection, school-nurses, etc. etc. He lays out and inaugurates a line of action, and, while passing from place to place performing this missionary work, keeps closely in touch with all towns he has visited, and always holds himself in readiness to be of service, whenever and wherever it is physically possible so to do. The importance of this work can hardly be over-estimated.

SECTION V.

The writer must not leave the discussion of the medical inspector without devoting a short time to his ablest assistant, the school-nurse. The school-nurse is one of the greatest inventions of the age, and is doing more practical good in the world than the writer has the power to describe. She has only been in existence a few years, but in this brief period has abundantly proved her worth, ability and indispensability. She is usually, but not necessarily, an offspring from a Visiting Nurses' Association, and may receive her entirely adequate salary (which should never be less than \$900.00 a year) from this association or from the city. In the city of Boston, for instance, in one year the school-nurses visited 22,293 homes of school children. They took 2,500 children to dentists, 9,000 to hospitals, and 7,500 to family physicians. They made 36,000 surgical dressings after operations, looked after 3,377 cases of defective vision and 348 cases of defective hearing. They made no trouble and no complaints were heard of their work. In Chicago during the year 1912 the visiting nurses made 162,000 house visits and administered to 51,000 patients. They spent \$76,000.00.

Each school-nurse is assigned to a certain number of schools and the children are placed under her care. She is at the school each day during the visit of the medical inspector, and assists him with his work. She

keeps a watchful eye over all the children and reports suspicious cases to the teachers and inspector. She takes care of emergency cases for the inspector, and under his instructions treats many cases of itch, eczema, ringworm, lice, etc., that can be as well and possibly better treated here than at home. She takes cases to the dispensaries and offices of physicians and surgeons, and sees that their orders are carried out at home. She takes children to hospitals and takes them home when the proper time arrives; afterward she makes surgical dressings at the child's home and takes the patient to the doctor's office or dispensary from time to time until the cure is complete. She 'follows up' cases that have been urged to consult a doctor and who have failed to follow this choice, and finds out why they have not done so, and uses her influence to see that the advice is heeded. It must be remembered that most of these poor children come from homes of dirt and ignorance, and that unless such things are done for them they will not be done at all, or, at least, only partly done. Therefore, if we desire results we must take the matter into our own hands, and act for them. This work the school-nurse most efficiently accomplishes.

Medical school inspection without school-nurses is almost as bad as a meal without food. Of what use is medical inspection unless the inspectors' suggestions are carried out, and it is perhaps the principal function of the school-nurse to see that this is done. The city of Philadelphia, in 1910, compiled some interesting statistics on this very subject, and speaking in round figures it was found that whereas about 80 per cent. of defective and diseased children remained uncared for, when the medical inspector was not aided by the school-nurse, only about 20 per cent. remained uncared for after the school-nurse was employed. Can anything speak more plainly as to her usefulness and necessity?

Besides these details in the life of the school-nurse, she endeavors to broaden and improve the lives and homes of all those people with whom she comes in contact in connection with her school work. She endeavors to inculcate into the minds of these people ideas of decency, sobriety, cleanliness and hygiene. She teaches them how to cook, clean and bathe; how to take care of their babies and prepare their food; she looks after the sanitary condition of the houses and worries the landlords if they neglect the plumbing, drainage, etc. In short, the school-nurse is an Angel of Mercy, flitting hither and thither in her never-ending work from one place to the other, carrying joy, and peace, and health, and goodwill wherever she goes, making the world better and brighter for her presence and rendering herself, when once known, an indispensable element in the life and well-being of her community.

A novel feature of school visiting nursing has been begun in Cincinnati, where they have appointed one nurse to do nothing but eye nursing. She has proved herself so useful, especially in handling purulent conjunctivitis that her services are to become permanent.

Germane to the subject of the school-nurse in her accepted capacity is the idea suggested by some authorities, and adopted by some towns, of allowing nurses not only to officiate as school-nurses, but also to act as medical inspectors. A carefully selected nurse can do this work extremely well, certainly sufficiently well for all practical purposes, and especially in small towns the plan has worked with great satisfaction. In small towns there are few doctors, and if one of these is appointed to examine the children, it inevitably produces much friction and strife. Indeed, in such places it is difficult, not to say impossible, for a doctor to be appointed to such a position, owing to professional opposition; but there can be no objection to an impartial nurse doing this work, who should be made to understand that she is positively not to use any influence in favor of any particular doctor. Competent nurses can be hired, for a reasonable financial compensation, to act in this way as school-nurse and school inspector, and wherever the plan has been tried it has given the greatest satisfaction.

SECTION VI.

Closely allied with medical school inspection and school-nurses is the establishment of school dispensaries, where detected pathological conditions may be properly treated. Such dispensaries should include a dental department. In large cities where schools are widely separated a dispensary of this nature should be established in each school building, where the poor, and the poor only, may be easily, promptly and conveniently treated. Those who can afford to pay a physician even a small fee should not be admitted to these dispensaries.

Cleanliness, health laws and good hygiene should be amongst the most important things taught in our public schools. They should become a habit. Cleanliness begets self-respect, and self-respect begets most of the best things in life. And even if the effect of cleanliness upon the individual is ignored, we cannot ignore the effect of cleanliness upon the community at large. Clean habits inspire people not to expectorate freely under unwise conditions, to keep water-closets clean, to dislike dirty towels, clothes, bodies, etc. etc. Besides this it must not be forgotten that grown up children pursue occupations where either cleanliness, or the reverse, may have a distinct effect upon the community at large. They may become cooks, or bakers, or handle milk, butter, cheese, candy, ice-cream, cigars, etc. etc., and, of course, the clean handling of such commodities is of great importance to the consumer. It may easily become a matter of health, sickness or death. The writer will never forget, when a boy, seeing a cheese-maker in Wisconsin stir up a vat of milk with his hands and arms. Upon one arm was a discharging boil. He has never been able really to relish Wisconsin cheese since.

Not only should hygiene be taught in our schools to the scholars, but this subject should be thoroughly elucidated in all Normal schools, so

that teachers may understand the subject and its importance and be prepared to convey this knowledge to the children, not only by precept but by example. This will also lead the teachers to study each and every child, not only mentally, but physically and morally as well: a practice which will result in much benefit to all concerned.

Teachers themselves should be compelled to present suitable medical certificates of health before being allowed to follow the teaching profession, and a renewal of certificates should be required from time to time, or as occasion requires. Ailing individuals are not qualified to perform the important function of teacher and overseer of children.

SECTION VII.

This brings the writer to the subject of the necessity for schools for defectives. About 3 per cent. of the school population is defective mentally, that is, more or less below normal, intellectually. A very large number of children appear to be defectives, but are soon raised to a perfectly normal standard by having such physical defects as adenoids, deafness, visual abnormalities, etc., corrected; but about 3 per cent. will remain mentally subnormal, even after all physical defects are relieved. Of course, in every school-room there will be found children who are older than they should be for the grades they are in; they make slow progress, and demonstrate that the grade studies are not planned for the average student, but for the superior student. These children are called 'repeaters,' and they are numerous, and it has been estimated that the United States spends annually \$100,000,000 for the benefit of about 3,000,000 repeating children. These children, however, are not necessarily mental defectives, but nevertheless many of them are. At all events the 'repeaters,' whether mentally defective or not, are very apt to drop out of school from discouragement, and then join the ranks of the uneducated classes, with all that that implies educationally, sociologically, morally and criminally. The underlying cause for repeating, in a vast majority of cases, is bad health or physical defects. That admirable Superintendent of Schools in Chicago, Mrs. Ella Flagg Young, in 1911, estimated that Chicago was spending \$270,000 per annum on repeating scholars. She seemed to feel that the cause was largely lack of 'superintendence' on the part of the teachers. The writer will venture the opinion that most of these 'repeaters' were either sick or physically defective, and that relief from these conditions would have cured their repeating. Mrs. Young's figures are certainly not excessive, for it is estimated that in Cleveland, a city, of course, much smaller than Chicago, \$200,000 annually is expended for the same purpose. In Minneapolis a year or so ago, about \$100,000 was spent in an unsystematic effort to educate defectives. It would have been much better to have spent this money in a properly directed movement to relieve the defects. Surely, that \$100,000 was not well or wisely spent.

The practical question which arises is, What are we going to do with mentally defective children? This question does not seem to bother school authorities very much, for they are usually placed in the public schools where they straightway become and remain a nuisance and a drag both to teachers and scholars. After a greater or less effort at the acquirement of a poor education, they, as a rule, ultimately leave school, untaught, uneducated and unelevated, and naturally drift back to their home environments which are usually bad, and degenerate physically and morally, probably enter into the criminal classes, and eventually bring to a sad termination a life that might, under other and better circumstances, have developed into something that would have been a joy to themselves and others, and a satisfaction to a public school system that had stepped in at the right time and brought order out of chaos. When such children are placed in a school-room with reasonably normal and bright pupils, the teacher either has to devote too much time to them, and too little to the balance of the class, or else too little time to them and too much to the balance of the class. The teacher has to neglect either one or the other; it is impossible properly to educate them both at the same time, and consequently the child who is subnormal is usually neglected and stays in the same room term after term, to the disgust and discouragement both of teacher and scholars. Besides this, such children are usually ill-tempered, vicious, filthy, and immoral, and easily by their very presence may succeed in upsetting the discipline and progress of an entire school-room. This is not justice to the teachers, to the scholars, or even to the poor defective himself. It is as clear as the noonday sun, that such children should be educated by themselves, where under special teachers, conditions and environments, they may be made to produce the best that is in each individual child. Therefore, there should be established, in all towns and cities, schools for defectives, devoted exclusively to the uplift, intellectually, physically and morally, of defective children. The writer believes it is better that these children should be educated in separate buildings, away from the great mass of children found in public schools, where they can be quiet and unmolested by normal but vicious scholars. Still, if school authorities feel unable to do this, separate rooms in school buildings should be set aside for their education. The writer believes, however, that the ideal plan would be to have enough small buildings or houses scattered around in the various districts of a city, where they will be convenient to the scholars. No school of this nature should accommodate more than twenty-five pupils, and a less number would be better. The school should be presided over by a teacher of exceptional ability, tact and patience, with a love for this kind of work. She should be better paid than other teachers, for she is doing harder and more exceptional work, and besides this, were the remuneration higher, more teachers would fit themselves for this kind of work.

Each child should study separately, and should be taught according

to his or her individual needs. This will necessitate divisions and subdivisions of classes; and it should be remembered that there are many things which these children need at first more than book studies. The writer means such things as cleanliness, morality, gentleness, deportment, discipline, etc. etc. As these children emerge from their intellectual darkness, and are found capable, they should, from time to time, be returned to the public school and to the grades to which they are best adapted. This will occur more often than one would imagine, and will be found to demonstrate the necessity for these special schools. It is estimated that 25 per cent. of the inmates of feeble-minded asylums can be made normal by the correction of physical defects and proper training, and that 40 per cent. can be made half normal. In the city of New York alone, they have at the present time nearly 500 classes for the instruction of mentally peculiar children.

There are those who believe that epileptics should be taught in separate schools; but personally the writer thinks that they might just as well be sent to the schools for defectives, to which he has just referred, as epileptics are almost invariably subnormal mentally.

Some pessimists believe that the world is overpopulated, and that it is foolish to waste time with feeble and weakly children. In the abstract they believe that in the end a high death-rate is really a blessing to the world, that the race is for the strong, and that the weak should be allowed to drop out. The writer does not know how the same pessimist would feel if the life of his own child was at stake; but certain it is, that it is our duty to prolong life and to alleviate human suffering, and to see that those who live should be made as strong as possible. Each nation should endeavor to build up a strong race, a sentiment which is being fostered by Japan, Germany, etc., who are looking far ahead into the future, and certainly there can be no starting point so encouraging and essential as the public schools of the various governments. Go to a watch, gun, or sewing machine factory and observe the care maintained in examining and inspecting each piece of metal or other material, which will ultimately be joined together to make up a perfect article to be placed before the customer for his approval. Nothing has been neglected to produce a commodity that cannot be criticized. Are we as careful with our children, to see that their bodies are made as perfect as possible, in every portion of their anatomy? The writer fears not, and yet how much more valuable is the child than either a watch, or a gun, or a sewing machine, and how much more important is it to the child, to his parents and to the world at large, that he should, as nearly as possible, reach physical and mental perfection, than that any article of commerce should be invulnerable to criticism; and we should not forget, as so tersely put by Ayers, that "irregular attendance is the chief cause of backwardness in school, and that non-promotion and ill-health is the chief cause of irregular attendance."

SECTION VIII.

The education of crippled and deformed children seems to be a problem that is devolving upon the public schools for solution, and it is interesting to know that in the city of New York alone there are about 7,000 of such afflicted children. Those children who are merely ordinarily crippled or deformed can, of course, be cared for and educated with other children; but there are many children extraordinarily afflicted, such as those who are armless or legless, etc., who need to be educated, perhaps along special intellectual and industrial lines to enable them to become self-supporting, and to prevent them from becoming charges upon the commonwealth. It is really more of a necessity, and a greater economical measure for the state to educate crippled children than normal children, for the crippled child usually must depend upon his intellect for his living (or else upon charity), while the normal child can force his body to produce a maintenance. There can be no question but that ultimately special public schools or departments for their education will be provided, as has already been done in New York, Chicago, etc.; and some cities provide free transportation, both to and from school, as it is found that school attendance is much more regular where children are gratuitously transported, as moving about is very painful to many crippled children. One great reason why crippled children should be educated separately is because they need different and varying forms of physical exercise in order to keep their bodies healthy, and to assist the surgeon in his efforts towards a relief from the deformity.

The blind, and the deaf and dumb children should also be educated under our public school system. These children are now usually educated in state institutions, away from the crowded centres of population, and this plan the writer thinks should be continued where children have either no homes, or have poor and degraded homes, for it is much better for such children to live and become educated in public institutions. But there are many such children with good homes and fond and loving parents who dislike exceedingly to have their children away from home and from its kindly and uplifting influence. The writer believes that public schools should be established for the care and education of such children, where they can be guided into educated and useful lives, and at the same time enjoy the delights of their home life.

In Newark, N. J., they have established what they call an Infants' Consultation Station which is located in one of the school buildings. This station is open three days in the week, between eleven and twelve o'clock, and is in charge of a doctor and a trained nurse. To this station parents bring their infants and are instructed as to the care of babies, how the best food can be prepared, how children should be bathed, and dressed, etc. etc. There can be no question but that this sort of thing will be the means of producing healthier and better nourished children,

and that when such children arrive at a suitable school age they will enter upon such work in much better condition than is usually the case with the children of the poor and ignorant.

SECTION IX.

Open-air schools are growing in popularity in this country. Sometimes these schools are held in tents, sometimes upon the roofs of school buildings. There can be no question but that they are extremely beneficial to school children, especially to those children affected with incipient tuberculosis.

The first open-air school in America was started in 1907 in Providence, R. I. Since then the idea has spread rapidly until at the present time there are in the United States over 200 of these schools in over 40 cities. There should be at least one such school to every 25,000 people.

Montclair, N. J., has probably carried these open-air schools to a state of perfection which has not yet been equalled by any other city in this country, although Chicago, New York and other cities are doing excellent work. In Montclair, for instance, the School Board pays the street car transportation of those children who would otherwise be unable, financially, to come to these open-air schools. The school is a commodious tent, which means, of course, that it is unheated and has abundance of fresh air and sunlight. The school provides all sorts of clothes, covers, etc., so that the children are amply protected against the cold weather of winter. The children are not allowed to remain in a sitting position long at a time, for fear of getting chilled, but frequently throughout the day are put through suitable exercises to limber them up and expedite the circulation. At ten o'clock in the morning a good home breakfast is served, consisting principally of hot broth, hot milk, cereals, etc. At noon a full dinner is served, and at 3 o'clock the patients are again given hot broth, hot milk and cereals. If the children can afford to pay a penny a meal they are allowed to do so, but if not, the meals are provided without cost. In the afternoon the children are seated in reclining chairs, thoroughly covered up and allowed to take a nap.

The education of these children consists not only in the ordinary studies, but they are particularly instructed with regard to cleanliness and the general and specific care of their health. There can be no doubt whatever that great improvement is made in the health of the scholars wherever these open-air schools have been started and retained. The children having increased in weight on account of their appetites and digestion having improved, to look at any of them after they have attended these schools for a few weeks, no one would imagine they were struggling with the germs of incipient tuberculosis.

The open-air school for tuberculous children on the roof of the College Settlement building in Philadelphia was opened May 16th, 1911. It is

conducted under the auspices of the Board of Public Education, the Phipps Institute and the College Settlement. The Phipps Institute supplies the management of the school, the nurse and the food; the Board of Education furnishes the teacher, textbooks, desks, and the pupils who are transferred from various schools, and the College Settlement gives the use of the roof, shelter, playgrounds, bathing and cooking facilities. The class was made up of twenty pupils, gathered from schools in walking distance from the School Settlement, and continued through the summer. Ten pupils reported the first day, and were each given a tooth-brush, tooth-powder, mouth-wash, wash rag, brush and comb and nail brush, and instruction in the use of these articles was the first lesson given. The school opens at eight o'clock each morning, which is the hour for the bath. At 8:30 breakfast is served and at 9 lessons begin in the open air and continue until 10:30. From 10:30 to 11 there are games, followed by a wash and rest until noon, when a hot dinner is served in the dining-room of the Settlement building. From 1 to 3 complete relaxation and rest, the children lying extended; from 3 to 4:30 lessons and games and then rest until 5:30, when the children are sent home after indulging in a good wash. Dr. Frank Craig is in direct charge of the work. The Phipps Institute plans to erect a large new school at Seventh and Lombard Streets, to which, on completion, this class will be moved and as many more like it established as funds will permit.

To reduce this subject to the sordid level of figures and money, in order to make its importance impressive, the writer will say that it has been estimated that about 7,000 children die every year in the United States from tuberculosis. The average age of these children who die has been estimated to be about twelve and a half years; and, inasmuch as the average age of children when they begin school is about six years, these children have been receiving free education by the state for about six years before they die. Now it has been estimated that it costs \$30.00 per year for the public school education of a child. These children have therefore cost the state for their education, before they die, about \$180.00 each. When we consider that about 7,000 children die in this country annually from tuberculosis, it means that the nation has expended over \$1,000,000 for their education, and this large amount of money has been absolutely thrown away by death—a total loss. Anything, therefore, which can mitigate these conditions, and relieve these children of tuberculosis and make them reasonably strong and healthy men and women, will conserve the expenditure of this vast amount of labor and money. It is cheaper to keep children well than to care for them after they become sick.

SECTION X.

Camping schools where children may enjoy the physical and mental benefits of outdoor life, nature studies, etc., are of great benefit, and very popular, and should wherever possible be encouraged. Vacation

schools in the city, were, the writer thinks, commenced in New York in about the year 1903. Their main object is to continue the school associations, studies and discipline of the winter months and to keep the children out of mischief in the summer. They are also intended to foster healthier hot weather conditions than can usually be obtained in the homes and tenements of the poor. Most parents are compelled to be at work during the day, and the children, being thus left to their own devices, roam the streets, and form bad associates, become dirty and slovenly in their habits, and to a greater or lesser extent lose the beneficial influence of the autumn, winter and spring school attendance.

In these vacation schools the studies are made easy (as children should not apply themselves much during the warm weather), and consist perhaps in lessons in cleanliness, hygiene, morals, good citizenship, light literature, travel, etc., the idea being simply to keep the children from the streets, bad associates, bad health, dirt, etc., and to retain the beneficial influence of school life. The question of vocational education in public schools is of vast importance, and the writer is confident that in the near future scholars will be trained in our public schools for almost all useful vocations.

The subject of free, or almost free, lunches, is engaging the attention of health and educational authorities, and is being practised with great success in many localities. These lunches are cheap, but warm and nourishing in character, and undoubtedly enable children to accomplish better results in school, as well-nourished bodies surely promote better intellectual advancement. The bodily resistance thus obtained also renders children less vulnerable to contagious and also to non-contagious diseases.

This brings to mind the idea which is carried out in many cities of the free distribution of spectacles to poor children who need them (after they have been properly prescribed by an oculist) and whose parents cannot pay for them. The money is raised either by charity, or by a fund set aside by the Board of Education. This is a most useful distribution of money, and really would not involve a very large sum in any given city, provided suitable arrangements are made with optical establishments, for the actual cost of a pair of glasses is not much. As an illustration of the infrequency of the necessity for such gifts, the writer will state that in the city of Cleveland, where this work is done quite thoroughly, it was only found necessary to give away glasses to about 380 children per annum. Twelve states distribute free textbooks, fifteen distribute them in certain districts, but in the remaining twenty-one states, no such distributions are made. Textbooks purchased by school authorities cost 20 per cent. less than when purchased by private individuals. In Massachusetts, immediately after the free distribution of books, the school attendance increased 10 per cent., a fact which certainly shows why some children do not attend school.

SECTION XI.

The writer has for many years been interested in the examination of school children's eyes, ears, noses and throats by school teachers, and for this purpose has devised a series of nine questions, the answers to which will disclose the existence at least of 90 per cent. of serious diseases or defects in these organs. Teachers are perfectly competent to make these tests, and a child can be easily examined in five minutes. If a defect is found a card of warning is sent to the parent urging action in the matter. A vast majority of children suffer from such defects that are more or less preventing satisfactory school progress.

Records of such examinations may be of the simplest character, or more careful reports may be made on the card index plan, which will follow the child from room to room for the additional annual records, and for the purpose of keeping the child, the teacher, and the doctor in close touch with each other.

A child whose eyes prevent comfortable study, or whose deaf ears render easy communication with those around him impossible, becomes retarded in school, discouraged and careless, truant and idle, and ultimately very likely leaves school, forms habits of idleness and vice, and not infrequently joins the criminal classes and becomes an expense to and a charge on the state in reformatories or prisons. To permit such children to follow such a program is neither economical, philosophical nor wise. Such defects should be systematically discovered and relieved (especially as the expense is almost nothing), after which the dull student may become bright and the hardship of study transformed into a pleasure. Even in cities having medical school inspection by Medical Inspectors, the writer believes it much better to have these eye, ear, nose and throat tests made either by the teachers or the school-nurses, preferably the former. It involves no expense, except the little necessary printed matter, and can be done with entire satisfaction by any intelligent teacher. The teacher by the aid of nine simple questions can discover the existence of nine-tenths of important diseases of these organs. The doctor to whom the child goes will diagnose and treat the disease or defect.

If, at the present time, certain cities and towns are not prepared to enter into a more or less thorough crusade against the unhealthy condition of schools and scholars, they can at least insist upon the teachers making these eye, ear, nose and throat tests, and see that everything possible is done to relieve such discovered defects; and this one act will go a long way toward improving the physical, moral and sociological condition of school-children.

The argument is sometimes advanced that it is better that the eye and ear tests be made by medical school inspectors than by teachers. It is quite significant, in this connection, to note that an important Committee appointed by the American Medical Association in 1911, to consider

the entire subject of the physical examination of school-children, gave it as their official and deliberate opinion that the best results were obtained where the first examination was made by school-teachers, and where the suspected cases were subsequently turned over to specially trained medical men. The Committee also declared that women (or men), intelligent enough to be teachers, were intelligent enough to make these annual, simple, systematic examinations. They also declared that no teacher should feel that these tests were an additional labor, because they were easy to perform, consumed but little time and inevitably resulted in a material reduction of the teacher's labors by changing stupid, exasperating children into bright and agreeable scholars, by relieving them of various physical defects which were obstructing them in the comparatively easy acquirement of an education.

Before leaving the subject of eyes, the writer wishes to remind the reader that in spite of the optimism of some people, trachoma, in our schools and elsewhere, is not yet wiped out. Some people think, that while this dreadful disease is still a scourge in India, Egypt, etc., it has been practically eliminated in this clean and enlightened country, and yet it can be found in varying quantities almost anywhere. Dr. John Green, Jr., states that out of 21,930 school-children, 223 of them had trachoma, and Dr. Thos. H. Stucky's account of trachoma in the mountains of Kentucky is most discouraging. In view of the fact that trachoma is contagious, and may be communicated by handkerchiefs, towels, wash rags, etc. etc., and is fostered and encouraged by bad air, filth, malnutrition, crowded rooms, etc., the necessity for clean, hygienic and proper school houses, decent homes, sufficient and proper food is at once apparent, even if no other element enter into the matter at all. London has even established Trachoma Schools where only trachomatous children are taught, where their eyes are not over-strained, and where they may constantly receive medical attention and suitable nursing.

SECTION XII.

One great reason for the lack of progress along the lines advocated in this paper is politics, starting with bad appointments to health and educational bodies, and ending in an entire misconception of duties, the building up of political machines, and the yielding to graft—petty and otherwise. The writer knows of Boards of Education in which can be found saloon-keepers, gamblers, quack doctors, ignoramuses, corrupt politicians, etc. etc. How much of progress can be expected of a Board in whose ranks can be found men of this description? They are placed there for political reasons, only to pay a political debt, or to cater to some political influence. How much uplift and advancement and high ideals can be expected of Boards, influenced by such members? Such men do not believe in high ideals, they call them 'fads,' and, while

saturated themselves with cupidity and avarice, believe all other men are built upon similar lines and are as incapable of pure motives and benevolent inspirations as they are themselves. Such progress as the writer advocates is therefore hard to make, because those having such movements in charge are compelled too frequently to plead their cause before an unsympathetic tribunal, incapable, or unwilling to believe that there are men and women in this world eager to work 'for the good of the cause,' and without hope of reward, except in the contemplation of progress to which they have given assistance, and in the consciousness of having performed their duty.

In conclusion, and realizing what he has left unsaid, the writer wishes to reiterate what he has already said, that whatever the expense of this work may be, it is cheaper and better and nobler to educate children properly in suitable buildings, and to produce and maintain a high health standard, than it is to educate them under reversed conditions and to pay the money out supporting criminal courts, reformatories, jails, hospitals, institutions for the deaf, blind, dumb, crippled, mental defectives, paupers, etc. etc., even if we have no ambition to produce a stronger race as one generation succeeds the other.

It must not be forgotten that a strong, virile, intellectual people is one of the greatest assets a nation can possess, not only in times of war, but also in times of peace, and each individual community should be willing to do its individual share in the general uplifting and improving and strengthening of the nation as a whole.

And then there is another and a higher motive for this work than anything which the writer has previously mentioned, and that is *our duty to each individual child*, who came into this world without volition, and perhaps with a weakly constitution, physical defects, or criminal tendencies. This child may be yours, or it may be mine; it makes no difference whose child it is, the community owes it a debt which it should discharge; and the writer has endeavored to point out how, at least, a portion of this debt may be discharged, and he hopes, sincerely hopes, that he may have succeeded.

7 West Madison Street.

MEDICAL AND SURGICAL PROGRESS.

THE X-RAY IN OBSTETRICS.

A REVIEW OF RECENT LITERATURE.

By E. H. SKINNER, M. D., of the Editorial Staff.

1. Edling (*Zentralbl. fuer Gynæk.*, No. 46, p. 1539, 1912).
2. Edling (*Fortschr. auf dem Gebiete der Roentgenstrahlen*, Vol. XVII, p. 343).
3. Edling (*Verhandl. der deutsch. Roentgen-Gesellsch.*, Bd. VIII, p. 50).
4. Eymer (*Zentralbl. fuer Gynæk.*, No. 41, p. 1358, 1912).
5. Pfahler (*Amer. Quart. Roentg.*, Vol. I, No. 3, p. 23).
6. Friedrich (*Fortschr. auf dem Gebiete der Roentgenstrahlen*, Band XVI, p. 400).
7. Fränkel: *Die Roentgenstrahlen in der Gynaekologie*. Schoetz, Berlin. 1911.
8. Gauss (*Verhandl. des V. Roentgen-Kongr.*, 1910).
9. Hickey (*Proc. Amer. Roent. Ray Society*, p. 79, 1911).
10. Krause (Ref. Reifferschied's article. See No. 15 in bibliography).
11. Leopold and Leisewitz (*Atlas von Zahn und Jaensch*, Dresden, 1909).
12. McLean and Hickey (*Journ. Amer. Med. Assoc.*, Vol. LVIII, No. 11, p. 751).
13. O'Donnell (*Journ. Amer. Med. Assoc.*, Vol. LVIII, No. 11, p. 748).
14. Potocki, Delherm and Laquerrière (*Bull. et Mém. de la Société de Radiologie*, Tome IV, p. 285, 1913).
15. Reifferschied (*Zwanz. Abhandl. auf dem Gebiete der med. Electr. und Roentgenkunde*, Heft 9, 1911).
16. Riddell (*Brit. Med. Assoc.*, 1907; ref. *Lancet*, Vol. II, p. 457, 1907).
17. Rodes (*Arch. d'élec. Méd.*, No. 309; Ref. *Fortschr. auf dem Gebiete der Roentgenstrahlen*, Vol. XVII, p. 341).
18. Schmidt (Ref. Reifferschied's article. See No. 15 in bibliography).
19. Zurhelle (*Zentralbl. fuer Gynæk.*, No. 36, p. 1177, 1912).
20. Von Jaksch (*Zentralbl. fuer inner. Med.*, No. 4, 1911; ref. *Fortschr. auf dem Gebiete der Roentgenstrahlen*, Vol. XVII, p. 250).

The use of the newer intensifying screens, more rapid photographic emulsions, and powerful generating apparatus has increased the ability

of the *x*-ray to determine pregnancy at a period early enough in gestation to be of decided value.

As early as 1897 Levy-Dorn was able to secure the shadows of the eight-month fetus in utero. If the *x*-ray is to be valuable to the obstetrician one must be able to skiagraph the fetus before—at least during the fourth or fifth month. After that time in gestation the *x*-ray will always return shadows which, while not a valuable addition to the clinical diagnosis of pregnancy, are quite serviceable to determine accurately the position of the fetus and estimate the contour of the pelvis. Manges and others have applied stereoscopic radiography in the measurements of the pelvic diameters and conjugate with satisfactory results. It need never be presumed that such *x*-ray measurements will supersede simple pelvimetry, but in a doubtful case such additional evidence would be splendid corroboration for the measurements obtained by the pelvimeter.

The *x*-ray diagnosis of pregnancy presents certain inherent difficulties. The surrounding amniotic fluid and the small calcareous content of the fetal bones, which are both contained within the hypertrophied uterus, are three hindrances to detailed *x*-ray shadows. To obtain valuable information regarding the fetal position it is best to radiograph the patient in the anteroposterior position, and this places the fetal shadows at a distance from the plate. The use of the compression diaphragm with the patient in the lateral position obtains fetal shadows more easily, but gives little accurate knowledge of the fetal position. The use of the posteroanterior position with the plate upon the abdomen is not only uncomfortable for the patient, but limits the interpretations regarding the position of the fetus and also regarding the pelvic bony parts. The respiratory movements of the mother and the fetal movements are further hindrances to good radiographs.

The usefulness of the *x*-ray is not limited to the mere determination of fetal shadows, for it may be employed to record the presence of twin pregnancy and extra-uterine gestation. Many cases have been reported where the *x*-ray has been of invaluable service in these conditions. One must always be careful not to read the spinal shadows incorrectly. The shadow of the fetal spine in certain positions casts shadows which simulate a double row of buttons, but this should not be interpreted as two spines of a possible twin pregnancy.

The American literature upon the obstetrical use of the *x*-ray is quite limited. O'Donnell presents some highly retouched *x*-ray pictures of pregnancies between the fifth and eighth months. He fails to describe his technique except to acknowledge one-fifth second exposures, and claims over one hundred and fifty successful exposures with no ill effect upon mother or child. An interesting case in his series presented an abnormal projection in the upper abdomen, which seemed to be of intra-uterine origin. Murphy was of the opinion that the *x*-ray shadows determined an ankylosis of a fetal elbow, an interpretation which was verified after birth. In the discussion of O'Donnell's paper, DeLee remarks upon the wide latitude of *x*-ray information in pregnancy. Not only the shape of the pelvis and possible mechanical difficulties of labor are determined by the *x*-ray, but one can judge upon which side to bring down a large occiput by locating the larger portion of the pelvic lumen in cases presenting gross deformities, distortions and alterations of the pelvic bones.

DeLee thinks the field rather limited in the mere determination of pregnancy, because we so seldom require other than the clinical evidence,

but that in fat women the x -ray may be valuable in differentiating a large fibroid from pregnancy or a hydatid mole after the fifth month. The x -ray evidence regarding hydrocephalus, anencephalus, double monsters, twin pregnancy and hyperossification is considered valuable. In cases of illegitimate pregnancy where abdominal examination is not permitted or cannot be suggested, the x -ray might discern the fetus.

McLean and Hickey present a case report where the x -ray differentiated between a pregnancy and a fibromyoma of the uterus. This case illustrates the ability of the x -ray in cases where the thickness of the abdominal wall in obesity makes the bimanual examination difficult. Mrs. B., *et. thirly-three*, was admitted to Harper Hospital, Detroit, November 7th, 1911. Since the age of eleven, she has been the subject of convulsive attacks, probably of hysterical origin, from which she is aroused with difficulty. She is the mother of three children, all of whom were delivered normally and are well at the present time. Twelve months before her admission to the hospital her menstruation ceased and has not been present since that time. Following the stoppage of her menses there has been a gradual enlargement of the abdomen, which on palpation was found to be uterine.

Previous to her admission to the hospital, she had been examined by several physicians who were unable to make a positive diagnosis of pregnancy. There was no history of nausea or vomiting. The breasts showed no enlargement or pigmentary signs. The patient was very stout, her weight being about 250 lb. The abdominal walls were very thick and quite relaxed. External manual examination failed to reveal anything which could be suggestive of a fetal body. Careful stethoscopic examination did not reveal the fetal heart-beat. Vaginal examination showed a slight softening of the uterine os. No ballottement could be elicited.

The differential diagnosis lay between large fibromyomata of the uterus and pregnancy. Accordingly, the day following her admission, two x -ray exposures were made, each of four seconds, and the Roentgen rays were directed laterally by means of a large cone-shaped diaphragm through the pendulous abdomen. Both plates distinctly showed the spine, the thoracic cage, and the legs and arms of a well-ossified fetus. The fetal head could not be distinguished. Therefore, from the examination of the x -ray plates, a diagnosis was made of pregnancy with the fetal head in the pelvis. On December 15th, the patient was delivered of a normal baby girl by forceps, the position being right occipitoposterior. The mother and child both did well and left the hospital on December 24th, 1911.

There are several splendid recent articles in the German and French literature. The illustrations accompanying the reports of Edling and Potocki, Delherm and Laquerrière are reproductions of satisfactory x -ray plates. They were made with intensifying screens, medium soft tubes, and interrupterless apparatus. Edling claims to be able to obtain shadows of fetal parts at the end of the second month and beginning of the third month of gestation, and encounters no difficulty in the later months. He considers the x -ray of value in determining multiple pregnancy, abnormal positions of the fetus, hydrocephalus and other fetal deformities, but has had little success in obtaining exact conclusions concerning the position of the fetal head in the pelvis. The fetal shadows in extra-uterine pregnancy are as easily obtained as in normal pregnancy, and their asymmetrical position in the pelvis during early pregnancy is of great diagnostic value. Edling's technical points are exact compression diaphragms, arrest of respiration and short exposure with intensifying screens. Edling

reports 22 cases in full, and among his entire material there has never been any harmful effects to mother or child.

Potocki, Delherm and Laquerrière have obtained good negatives at the fifth month with the refinements of modern apparatus. They consider the preparation of the patient by cathartics and enemata of prime importance, and in addition insist upon a comfortable position for the patient. Their exposures were made with the tube beneath the table and compression of the plate upon the abdomen. Their reproductions are splendid.

Zurhelle reports a case of extra-uterine gestation at term in which the fetal shadows were directly in the median line and contrary to Edling's diagnostic point. Zurhelle placed a metal sound in the uterine cavity before the radiograph was made, and thus aided in determining the extra-uterine pregnancy. But Edling replied later to Zurhelle's criticism with the statement that the asymmetrical position of extra-uterine fetal shadows does not continue in the later months of pregnancy and that at term such shadows cannot be differentiated from the normal by position alone. Edling also warns against the introduction of a uterine sound for quite obvious reasons.

Eymer's article carries twenty-one case reports of interest. He is quite enthusiastic over his ability to determine the obstetrical position of the fetal head by the sharper detail of that portion of the skull which is nearest the plate, giving due consideration to the tube position. At the best, this is crude interpretation, and stereoscopic negatives are surely obtainable with such short exposures. Eymer rather favors a technique employing the lateral position of the patient, although his exposures were made in the anteroposterior position. He seems to cover the province of the x -ray in normal pregnancy quite well when he says that to the three cardinal symptoms of pregnancy, i. e., fetal movements, palpation of fetal parts, and auscultation of fetal heart sounds, we can now add a fourth cardinal symptom—namely, the shadows of fetal parts upon the x -ray plate.

Von Jaksch claims to obtain fetal shadows repeatedly at two months by his technique which employs metal filters, hard tubes, forty milliamperes through the tube, and a twelve to fifteen second exposure with a coil. Such details of technique seem incongruous.

Rodes advocated introducing a film or plate (7.5x4 cm.) in the vagina and thus hoped to return fetal shadows in the first month. He claimed to have a film showing a three-month-pregnancy, but the reporter stated that the shadows were not easily recognized. There is no evidence in the literature of any repetition of such a technique in practice or experiment.

Rindfleisch reports an interesting experiment where he injected bismuth and water into the uterus of a suspected tubal pregnancy. The opaque media filled the uterine cavity and the tube upon the suspicious side, and he interpreted the bulge in the shadow of the tube as indicating the site of the tubal pregnancy. None of the opaque media entered the Fallopian tube upon the unaffected side. This case was reported before its termination, and therefore there is no check upon Rindfleisch's interpretation or the safety of his technique. The report is decidedly premature but is included to stimulate radiographic imagination.

There have been attempts to produce abortion by means of repeated x -ray exposures. Some successes have been reported in the early months of pregnancy after as many as twenty-five to thirty-three treatments.

There has never been an abortion reported in any case where the x -ray was applied for diagnosis. The diagnostic exposures are entirely too short to produce any changes whatever in the fetus or upon the integrity of the pregnancy. Fränkel succeeded in interrupting pregnancy at the third month in a tubercular patient after twenty-five exposures of five to ten minutes' duration, protecting the abdomen against the soft rays and focusing upon the uterus at a distance of 60 cm. Krause, on the other hand, was unable to produce an abortion at the fourth month in a tubercular patient with the same technique. Schmidt attempted to produce an abortion at the second month in a tubercular patient, using a hard tube (6-8 Walter), focus-distance 17 cm., and no filter. He produced a bad dermatitis after three exposures within seventeen days, with a total of one and one-half erythema doses, divided between the right and left ovarian regions. He did not succeed, and warns against x -ray attempts to induce abortion, because of its unreliability and because the increased blood supply to the abdomen promotes and augments any accidental burn. Supporting Fränkel, however, we find Gauss reporting satisfactory results in terminating pregnancy in the early months by x -ray exposures. He rather warns against its use, however, because of its unreliability and the attendant dangers through accident. Friedrich, Forsterling, Pinard and others have had only failures in their x -ray attempts at abortion.

The possible influence upon future pregnancies is important. The changes in the ovaries from the x -ray exposures to produce abortion may produce either a sterility, or deformities in the fetal development of a succeeding pregnancy. Gauss and Reifferschied are quite mindful of this possibility and warn the physician to inform the patient so that no blame may ensue.

The measurement of the pelvic brim from its x -ray shadow has been presented by many writers. Riddell places the patient upon the abdomen, and the tube below the couch is focused at right angles to the centre of the plane of the pelvic brim with the plate resting upon the sacrum and ischial tuberosities. This is a typical English technique. He measures the shadow of the brim upon the plate and finds practically only a small error in his experiments upon cadavers. Pfahler also proposed, at about the same time, a technique for measuring the pelvic brim by the single plate. His technique can be better copied by reading the original article. Manges remarks upon the small amount of literature upon this subject, but believes this is due to the lack of a demand for x -ray measurements rather than to a lack of value in the method. He describes a method of pelvimetry with stereoroentgenography by means of the cross-thread localization method of Mackenzie-Davidson. There is every advantage in Manges' method over the single plate pelvimetry, as the latter demands definite and similar relations to the plate regardless of the contour or thickness of the patient and a precise direction of the x -ray. Manges' article is well illustrated and furnishes a description which is easily followed.

Why does the profession fail to take advantage of x -ray pelvimetry? Is the mechanical pelvimeter quite sufficient? Would it not be commendable to fortify pelvimeter readings by the x -ray negative of the pelvis, which, besides furnishing corroborative measurements, will also give information regarding the changes in the pelvic contour and at the same time orientate the fetal position, etc.? Yet we find each author, who describes an x -ray pelvimetric technique, acknowledging the small number of cases submitted in practice.

Reifferschied mentions several studies in obstetrics which have been undertaken by radiologists—namely, the fluoroscopic examination of the position of the heart and the form and configuration of the diaphragm in pregnancy; the demonstration of the injected blood systems in the fetus and the *x*-ray study of fetal development; the study of the healing of the symphysis after hebeotomy and the spread of the sacro-iliac joint; a study of the condition of the bladder during birth and of typical changes in the bladder, ureters, and kidney-pelves during pregnancy; the study of the changes in the blood-vessels of the uterus during pregnancy and in the non-pregnant uterus at different ages; and of the placental blood-vessels after opaque injection.

Certain ailments occurring as accidents during pregnancy lend themselves to *x*-ray diagnosis, such as foreign bodies in the bladder and calculi of the genito-urinary tract. Abscesses and fistulæ may be injected with opaque emulsions and radiographed. The bismuth meal can furnish information concerning gastric diseases in the pregnant woman.

It would seem that the rôle of the *x*-ray in obtaining definite information as to the position of the pelvic anatomy and measurements had escaped prominence in the attempt to obtain fetal shadows at a very early date. The new serum diagnosis of pregnancy will eliminate any such *x*-ray necessity. Let us hope then that the future will find the *x*-ray assuming the conservative position of a diagnostic agent capable of corroborating clinical evidence by definite shadows.

MENORRHAGIA AT PUBERTY.

A REVIEW OF RECENT LITERATURE.

By HUGO EHRENFEST, M. D., of the Editorial Staff.

1. Bell: Chemical Composition of Menstrual Fluid. (*Journ. Obstet. British Empire*, p. 209, April, 1912.)
2. Coe: Menstrual Disorders of Obscure Origin. (*Amer. Journ. Obstet.*, p. 790, May, 1911.)
3. Dalché: Virginal Metrorrhagia. (*Revue mens. de Gyn., d'Obst. et de Péd.*, May, 1912; ref. *Amer. Journ. Obstet.*, p. 292, August, 1912.)
4. Editorial (*Journ. Amer. Med. Assoc.*, p. 262, December 10th, 1910).
5. Fränkel and Boehm: Genital Hemorrhages in Hemophilia. (*Monatsschr. fuer Geb. und. Gynæk.*, Vol. 30, p. 417.)
6. Henkel: Interrelation Between Uterus and Ovaries. (*Muench. med. Wochenschr.*, No. 7, p. 337, 1911.)
7. Hœfnagel: Influence of Menstruation on Coagulability of Blood. (*Zentralbl. fuer Gynæk.*, No. 12, p. 379, 1912.)
8. Keller: Coagulation of Blood and Ovarian Function. (*Zentralbl. fuer Gynæk.*, No. 38, p. 1253, 1912.)
9. Klein: Pathology of Menstrual Hemorrhage. (*Monatsschr. fuer Geb. und Gynæk.*, Vol. 35, p. 146.)
10. Kurdinowsky: Insufficiency of Uterus. (*Wratsch.*, No. 16, 1911; ref. *Zentralbl. fuer Gynæk.*, No. 38, p. 1357, 1911.)
11. Lier: Influence of Calcium Lactate on Hemorrhages. (*Beitr. zur klin. Chir.*, Vol. 79, p. 1.)
12. Parry: The Relation of Athletics to the Reproductive Life of Woman. (*Amer. Journ. Obstet.*, p. 341, September, 1912.)
13. Poelzl: Small Cystic Degeneration of Ovaries as Probable Cause of Uncontrollable Metrorrhagia. (*Wien. klin. Wochenschr.*, No. 17, 1912.)
14. Pollosson: New Method of Treating Metrorrhagia. (*Lyon Méd.*, December, 1909; ref. *Amer. Journ. Obstet.*, p. 971, June, 1910.)
15. Schickele: Theory of Menstruation. (*Zentralbl. fuer Gynæk.*, No. 54, p. 1561, 1911.)
16. Schloessmann: Hemophilia and Its Treatment. (*Beitr. zur klin. Chir.*; ref. *Zentralbl. fuer Chir.*, No. 47, p. 1608, 1912.)
17. Siredy and Lemaire: Virginal Metrorrhagia. (*Revue de Gyn. et de Chir.*, February, 1911; ref. in *Amer. Journ. Obstet.*, p. 916, May, 1911.)
18. Sturmdorf: Studies on a Local Hemotologic Factor in the Causation of Uterine Hemorrhage. (*New York State Journ. of Med.*, October, 1911.)

19. Voorhoeve: Theoretical Basis of Calciumtherapy. (*Berl. klin. Wochenschr.*, No. 36, 1912.)
20. Weil: Excessive Menstrual Hemorrhage at Puberty. (*Ann. de Méd. et Chir. Infant.*, September, 1912; ref. *Journ. Amer. Med. Assoc.*, p. 1577, October 26th, 1912.)

The fact that the puerperal state, abortions, and polyps undoubtedly form the most common cause of pathological uterine hemorrhages is probably responsible for the erroneous conception, almost as common among physicians as among the laity, that every menorrhagia or metrorrhagia is the direct result of some primary lesion in the uterus, or more specifically in the endometrium. This erroneous conception is responsible for the all too general tendency to direct therapeutic efforts towards the uterus in dealing with conditions of this sort. The unavoidable failure of such local therapy, and lately, the very careful histological study of uterus and endometrium in its normal and pathological condition, have convincingly proved that in many instances other and more remote causes must be looked for to explain some of the most obstinate, severe and even fatal types of uterine hemorrhage.

The writer had occasion to give a comprehensive review of newer theories of obscure hemorrhages in another paper,* in which he attempted to show that certain abnormal vasomotor conditions resulting from abnormal impulses transmitted to the uterus, from a normal or diseased central nervous system, are possibly responsible for abnormal uterine hemorrhages. Such nervous influences undeniably play a rôle in some cases of pathological menorrhagia of puberty. But careful study of a number of cases in practice must convince the unbiased observer that such an explanation is not applicable to all these cases, no more than the theory of the relative muscular insufficiency of the uterus as proposed by Theilhaber or Kurdinowsky.

Some new phases of this problem have been elucidated by recent investigations of the interrelation existing among the ductless glands, and of the differences in the coagulability of normal and menstrual blood.

Among the glands with internal secretion the ovaries obviously exert the most direct and potent influence on the function of the uterus. That the normal formation of the generative organs in the fetus, and their normal further development in extra-uterine life, especially at puberty, is dependent upon the existence of a normal amount of functioning ovarian tissue, is to-day an indisputable fact. The exact relation of ovarian function to a normal or pathological menstruation, however, still remains debatable.

Although the endometrium has been subjected to a most painstaking histological study, Klein states, no acceptable explanation of the functional significance of the uterine hemorrhage has ever been given. A biochemical relation of the endometrium to the ovaries is generally assumed. They produce substances with a definite physiological action. Summarily Klein calls them oophorins, subdividing them into folliculins, ovulins and luteins. In his opinion, these oophorins exert a specific effect on the endometrium in relation to menstruation and play a rôle in rendering the menstrual blood incoagulable. He furthermore advances the theory that under certain conditions, and probably only in a minority of instances, an overproduction of oophorins may lead to menorrhagia or

*The Influence of the Central Nervous System in the Causation of Uterine Hemorrhages. (*Amer. Journ. Obstet.*, August, 1908.)

metrorrhagia through overstimulation of the endometrium. To eliminate this excessive amount of oophorins a larger amount of blood is required, and in this form a menorrhagia, as in the pubescent girl, might be only a physiological phenomenon.

Less theoretical is the explanation offered by Henkel. He enumerates many of the well known and some of the rarer causes of metrorrhagia; among the latter, nervous influences, histological changes at time of climacteric, local congestions as the result of inflammatory conditions or even only due to chronic constipation, muscular insufficiency, and chlorosis; and he emphasizes that the true endometritis is certainly rarer than it is thought to be. He also refers to the work of Brennecke, Pankow and others, who described an etiological relation of metrorrhagia to anomalies of the ovaries. From a careful study of the ovaries during laparotomies, Henkel is now convinced that the etiological factor lies in anomalies, both in the development and rupture of the follicles. An increased follicle maturation overstimulates the endometrium.

Pöelzl had occasion to examine the ovaries of four young women suffering from severe metrorrhagia, in one instance actually causing the death of the patient. They had never been pregnant, had never shown any symptoms of an inflammatory process, but in all four he found a small cystic degeneration of the ovaries, which condition, in his belief, is responsible for the hemorrhage.

In discussing virginal metrorrhagia Dalché states that in many cases there cannot be found any anatomical basis for the hemorrhage in the uterus or other pelvic organs outside the ovary itself. This seems irregular in its function, a phase of insufficiency being succeeded by another of hyperfunction and vice versa. In some cases this condition seems due to a too rapid and sudden growth and maturation of the ovary. In other cases there is a distinct hereditary influence. This condition may be a symptom of family degeneration, or may result from a latent tuberculosis, from hereditary syphilis, or from a disturbance of the ductless glands, especially of hypophysis, thyroid and adrenals. In young girls menorrhagia may be the result of a chlorosis, but it is also often seen in subjects of neuro-arthritis or those suffering from struma, chronic constipation, mitral stenosis or hemophilia.

Decidedly more specific are the statements made by Siredy and Lemaire. Profuse menorrhagia is not rare in girls between fourteen and twenty. Usually it occurs without histological changes in the endometrium, but often associated with incomplete development or insufficient function of thyroid, hypophysis, or ovaries. In these cases the hemorrhage is due to circulatory changes. In neuro-arthritis a part of the trouble is vasomotor. In cases of utero-ovarian syphilis there exist parenchymatous or vascular alterations of the uterus. He found a true adenomatous condition of the endometrium in 4 cases, in which no benefit followed the medicinal treatment, and a cure finally was obtained by curettement.

An editorial writer in the *Journal of the American Medical Association* gives as his opinion that the profuse menstruation of young girls is generally due to excessive activity of the thyroid gland, whereas its underactivity causes amenorrhea and chlorosis. (This opinion seems incompatible with the common observation of menorrhagia, especially in chlorotic girls.) The thyroid, this writer continues, is also often at fault, i. e., is hypersecreting when menstruation appears at shorter intervals than the normal.

References concerning the etiological relation of the hypophysis to menstruation cannot be quoted. A close connection existing between this gland and anomalies of menstruation is at least assumed by those who, testing empirically the therapeutic effect of the extract of the pituitary body, administer this substance in cases of menstrual disturbances. It seems that at the present time about as good results are claimed for cases of menorrhagia as amenorrhea. Thus it seems that the question remains undecided as to whether menorrhagia of puberty is the result of a hypersecretion or hyposecretion of only one or more, or of which one, of the ductless glands.

Turning to the problem of the coagulability of blood and its possible bearing on an abnormally free discharge of blood during menstruation, first of all the generally acknowledged fact must be stated that normal menstrual blood does not coagulate. The explanation formerly given that this is due to the admixture of a large amount of uterine mucus cannot be maintained any longer, although Theilhaber, in discussing Klein's paper, already quoted, still claims that his own experiments convince him of the correctness of this older view. Bell recently had the opportunity to study the retained menstrual blood of 12 cases of hematocolpos. He established two important facts, first that the menstrual blood does not coagulate on account of the absence of fibrin ferment and fibrinogen, and not as the result of any admixture of mucus or lactic acid; secondly, that the calcium excretion in the menstrual discharge is very large.

The opinion, often expressed, that during menstruation the co-efficient of coagulability for blood is changed, is contradicted by Keller and Höfnagel. Keller, using Buerker's method, ascertained that the blood of woman coagulates on an average in 4.65 minutes. This time of clotting remains uninfluenced by menstruation, pregnancy, menopause, or castration. Höfnagel employed Addis' method, and came to the conclusion that the menstrual state in general does not seem to show any influence on the clotting time. He, therefore, suggests that there must be a local factor explaining the changed condition of menstrual blood as regards its coagulability. Before entering into a discussion of this last point, we should refer to the relation of hemophilia to our problem.

According to Schlessmann it is characteristic of hemophilia that not only coagulation is delayed, but also that the resulting coagulum is inferior, since it fails to contract into a firm cake—points which may be of special importance in the case of a uterine hemorrhage. The significance of hemophilia in anomalies of the menstrual flow has now been definitely established through the most careful study of this question by Fränkel and Böhm. They found reports on 151 such cases in the literature, and drew from them the following conclusions. In hemophilia the uterus during menstruation does not seem as markedly affected as should be expected in consideration of the size of the bleeding area. Only in about one-third of the cases was the regularity of menstruation disturbed and in many of these instances even in form of a delay in appearance. Indeed, some of the patients were amenorrheic for a considerable period of time. In some instances the flow is of normal duration, in a large number, however, abnormally prolonged. There are 10 cases recorded of fatal menorrhagia, and a few others mentioned in which patients were barely saved.

In reference to the question of the non-coagulability of menstrual blood, reference must be made to the article of Schickele, already quoted, and to a paper by Sturmdorf.

Schickele, like Klein, assumes that the ovaries produced definite substances which affect the endometrium, which reduce blood-pressure, and which just before and during menstruation appear in the uterine cavity and there inhibit coagulation. According to Schickele these oophorins can be found in the menstrual blood. With the cessation of the production of these substances in the ovaries, the menopause sets in. Schickele obtained substances by making an extract from crushed ovaries, which, when injected intravenously into animals, reduced blood-pressure and delayed coagulation.

Sturmdorf attempts to show, in a very interesting article, that these coagulation-inhibiting substances probably are formed in the endometrium itself, a view previously expressed, as already mentioned, by Hoefnagel. In Sturmdorf's opinion muscular deficiency (Theilhaber) similar to uterine arteriosclerosis fails to exhibit that uniform regularity of association with uterine hemorrhages so essential in establishing the relationship of cause and effect. The great majority of the muscularly deficient pubescent uteri, as well as those presenting fibrosis or arteriosclerosis at the menopause, do not bleed excessively under otherwise normal conditions. The hitherto accepted theory, attributing absence of coagulation in normal menstrual blood to the presence of viscid alkaline mucus, is no longer tenable because no such admixture inhibits coagulation in any other coagulable fluid of the body. Sturmdorf found that blood flowing from an experimental puncture of the cervical tissue external to the endometrial zone promptly clotted, while the simultaneously discharged menstrual blood failed to coagulate. This proves that the endometrium received normally coagulable blood and gave vent to this blood in a non-coagulable state. This local loss of coagulability can be explained in two ways: First, by attributing a dialytic function to the endometrium, as a result of which some element essential to coagulation is filtered from the normal blood. The second explanation assumes the existence in the menstrual blood of an inhibiting substance generated *in loco*. Cristae and Denk support the dialytic theory in spite of the fact that they found that neither calcium, fibrinogen, nor ferment are noticeably reduced or absent in menstrual blood and that the artificial incorporation of these substances into menstrual blood does not induce clotting. These very findings of Cristae and Denk prompted Sturmdorf to reject the dialytic theory in favor of the second, which assumes the generation in the endometrium of an inhibiting substance during menstruation. In his belief it is this element, preventing coagulation and probably augmented in activity by contributory structural anomalies, which presents a local causative factor in the causation of other uterine hemorrhages.

Sturmdorf does not consider Schickele's work in his paper, but it is obvious that if Sturmdorf's observation of normal coagulability of cervical blood during menstruation is correct, Schickele's assumption of a generation of these inhibiting substances in the ovaries is disproved. Schickele himself claims that these substances are transported from the ovaries to the endometrium by way of the circulatory system. If this is correct, they would necessarily affect the cervical blood as well as the endometrial.

From the foregoing but one conclusion can be drawn: While recent work has advanced some proof that anomalies in the function of certain glands of internal secretion, and probably also some peculiar local processes in the endometrium affecting blood coagulation, may account, in some instances, for anomalies in the menstrual flow, these new discoveries

certainly have not solved the question of the etiology of menorrhagia at puberty. This condition undoubtedly is due to a multiplicity of causes, some discoverable in the individual case, many still unknown. It is this uncertainty of the etiology which explains the great variety of therapeutic suggestions.

Coe, discussing menstrual disorders of obscure origin, vividly pictures the feeling of utter helplessness that will overcome the conscientious gynecologist when dealing with a menorrhagia in a young girl, which has recurred after several curettements and is so much more obstinate in her than in the married woman. "We have all had such cases under observation and have been discouraged by the failure of minor operations to relieve symptoms."

On the other hand, we find among others Siredy and Lemaire advocating curetting. In four of their cases, in which no benefit followed the usual dietetic and medicinal treatment, a cure was finally obtained by curettement. In all four of these cases the scrapings showed a similar uterine lesion, an adenomatous condition of the endometrium. Henkel and Pöelzl, already quoted, who ascribe the menorrhagia to anomalies in the ovaries, are in favor of conservative operations on the ovaries. In one of Pöelzl's cases a perfect result was obtained by means of a bilateral oophorectomy, certainly a heroic operation. Fränkel and Böhm point out the fact that in cases of hemophilia the hemorrhage may occasionally be excessive, demanding very prompt action. In these instances the known styptic drugs, even the latest additions like gelatine and blood serum with the exception of adrenalin only, work too slowly, and, therefore, in these cases uterine packing is the sovereign method. For these cases, however, a new method of controlling uterine hemorrhages, devised by Pollosson, may be of great value. He places an elastic clamp over the cervix in such a way that the cervical canal is occluded. This clamp may be left in place up to forty-eight hours without doing harm. It may be stated that this method is obviously not applicable to puerperal hemorrhages. Schlössmann found that a pressure extract made of tissue of a struma proved the most effective styptic in hemophiliacs when applied locally to the bleeding area. For obvious reasons this method will not prove feasible in dealing with uterine hemorrhages.

The value of the much recommended calcium theory seems at least problematical. According to Voorhoeve the calcium content of the blood can be increased by the administration of calcium in large doses. But abnormally low calcium content of the blood is not always the underlying cause for an existing tendency to hemorrhage. We really do not know anything concerning the influence of calcium administration on the components of coagulation, but an increase of the calcium in the blood certainly does not necessarily cause an increased coagulability of the blood.

Thus we find that Lier who gave calcium to 40 patients obtained an increased coagulability only in 14 cases; in 7 cases it was found increased and decreased at various times; and in 16 cases, after the administration of the calcium, coagulability actually was decreased.

Many writers recommend the various gland extracts. Dalché feels that each case must be treated according to its etiology. In many cases, ovarian, thyroid or mammary extracts may be of great value. The editorial writer in the *Journal of the American Medical Association*, mentioned before, who ascribes the menorrhagia of puberty to a hyperactivity of the thyroid, claims that the best treatment for this condition, in the

absence of any palpable uterine cause, is mammary extract in tablet form, to be crushed by the teeth, taken in doses from 3 to 5 gr. three or four times a day. If taken during the flow it will shorten its duration, or when administered in the interval, it will often postpone the appearance of the next flow to its normal time.

Rest in bed, hot water douches, ice-bag, ergot and stypticin represent the measures and drugs almost universally recommended. Opinions seem divided concerning the value of exercise, which does not seem surprising in view of the disparity of views elicited in an inquiry made by Parry concerning the beneficial or possible harmful effect of an athletic life on the reproductive functions of the young girl. We may conclude this review with a synopsis of a paper by Weil, which not only considers the therapeutic methods already mentioned but adds a new one. Weil is convinced that this tendency to excessive menstruation is a manifestation of constitutional inferiority from defective functioning of one or more of the ductless glands. Consequently, menorrhagia at puberty should compel careful examination for possible disturbances in these glands and the administration of appropriate organotherapy. In other instances, patients being very small or very obese, the hemorrhage must be combated by general measures. Operations are useless and dangerous. The first thing is to check the hemorrhage, and Weil accomplishes this by local application of fresh normal blood-sérum by means of vaginal douches or enemata and by subcutaneous injections. 20 c.cm. may prove sufficient or the injection may have to be repeated every month or twice a month. This serotherapy must be supplemented by the proper organotherapy. In his cases thyroid extract in small doses seemed to improve the general condition, accelerating growth or reducing obesity—all tending to restore the physiological balance in the ductless glands and thus arresting the tendency to excessive hemorrhage.

THE TREATMENT OF PULMONARY TUBERCULOSIS.

A REVIEW OF RECENT LITERATURE.

By S. STROUSE, M. D., of the Editorial Staff.

1. Bandelier and Roepke: *Lehrbuch der Spezifischen Diagnostik und Therapie der Tuberkulose*. 7th Edition, 1913. Curt Kabitzsch, Wuerzburg.
2. Brown (*Trans. National Assoc. for the Study and Prevention of Tuberculosis*, p. 323, 1912).
3. Hamman and Wolman: *Tuberculin in Diagnosis and Treatment*. D. Appleton and Co., New York. 1913.
4. Haupt (*Beiträg. zur Klin. der Tuberk.*, Vol. XXIII, 1912).
5. Litzner (*Zeitschr. fuer Tuberk.*, Vol. XVII, p. 549, 1911).
6. Meissen (*Beiträg. zur Klin. der Turberk.*, 1912).
7. Roemer and Joseph (*Beiträg. zur Klin. der Turberk.*, Vol. XVII, p. 281, 1910).
8. Leschke (*Int. Zentralbl. der gesamm. Tuberk. Forsch.*, Vol. VI, Nos. 10 and 11, 1912).
9. White and Van Norman (*Trans. National Assoc. for the Study and Prevention of Tuberculosis*, p. 333, 1912).
10. Brauer and Spengler (*Beiträg. zur Klin. der Tuberk.*, Vol. XIX, No. 1, 1911).
11. Brauns (*Zeitschr. fuer Tuberk.*, Vol. XVIII, p. 549, 1912).
12. Hamman and Sloan (*Bull. Johns Hopkins Hospital*, Vol. XXIV, p. 53, 1913).
13. Hymans van den Berg, de Josselin de Jong, and Schut (*Beiträg. zur Klin. der Tuberk.*, Vol. XXVI, p. 47, 1913).
14. Keller (*Beiträg. zur Klin. der Tuberk.*, Vol. XXVI, p. 47, 1913).
15. Lapham (*Amer. Journ. Med. Sciences*, Vol. 143, p. 503, 1912).
16. Robinson and Floyd (*Archives Int. Med.*, No. 9, p. 452, 1912).
17. Saugman (*Beiträg. zur klin. Med.*, 1911).

This review will embrace the present conceptions of tuberculin therapy and artificial pneumothorax. Recent literature on these subjects has assumed tremendous proportions and we shall make no attempt to abstract all the reports. Much work has been done in the manufacture of various kinds of tuberculin, all of which have aimed to produce an ideal substitute for Koch's original tuberculin. Lawrason Brown says there is no difference in action save that some are more poisonous than others. This opinion seems to be fairly general, so that we do not consider it necessary to enter into this phase of the question.

The effect of tuberculin on artificially produced tuberculosis in laboratory animals has been extensively studied, and no definite therapeutic results have been obtained. Much of this work seems to be open to criticism, and practically none of it can be used to assist in the administration of tuberculin in man.

The disputed point concerning the method of administration hinges on whether or not a reaction is desired. Most workers seem to find best results with a dose of tuberculin just below the point of a local or general reaction. White and Van Norman have made interesting contributions to this question in their study of the opposite point of view. In a second report they give results to strengthen their original contention that a local reaction is necessary if the best effects of tuberculin are to be obtained. Their method consists in finding the dose of tuberculin which would give the minimal cutaneous reaction around a point of scarification. On the basis of this skin test, they determine the amount of tuberculin which, given subcutaneously, produces a reaction of proper degree. The details are quoted from their report: "In all skin tests 1/100 c.cm. of the solution of tuberculin is used. As 1 c.cm. pure TO contains 1,000 mgrm. of tuberculin, we can easily determine the amount of tuberculin placed on the skin in all cases. Definite solutions of tuberculin are used, and each patient is tested until we find the solution of tuberculin of which 1/100 c.cm. when applied as a skin test will produce a reaction—redness, and some induration measuring exactly 4 mm. in diameter—within seventy-two hours. Such a reaction we call a minimal cutaneous reaction." The amount of tuberculin contained in 1/100 c.cm. of the solution which gives the minimal cutaneous reaction will, when given subcutaneously, produce a definite local reaction. The amount producing this reaction varies greatly with each individual, and White claims that this method or one similar to it is the logical way of estimating tuberculin dosage. The injections by this method are given once in two weeks, whereas the usual procedure is to give gradually increasing doses twice a week. Brown has worked out a logarithm table to govern dosage.

The choice of cases for tuberculin therapy has, as is well known, caused considerable disturbance. The harmful effects of its wide use immediately after Koch's discovery, provoked the usual scepticism concerning new therapeutic agents; but now there seems to be a general view that the moderately advanced chronic case with tubercle bacilli in the sputum offers the best hope of success. Some incipient cases may do better with tuberculin than without, but there is no means of selection which throws any light on the probable outcome of such treatment. As Wolman pointed out, impressions have too often been the standard of comparison of results of tuberculin. Good statistics are lacking, and the final count must be settled on statistics—economic efficiency, length of life, and disappearance of tubercle bacilli.

There are, however, certain fairly well-defined contraindications to the use of tuberculin; for it must always be remembered that it is a powerful toxin capable of doing great harm as well as good. Tuberculin should not be used (1) in very acute cases, (2) in cases with severe complications, and (3) in cases with high fever or in those with an acutely progressive loss of weight. Furthermore, in giving tuberculin the temperature curve is not the only index to successful treatment. Disregarding the rare occurrence of serious complications, there are still to be considered certain more or less minor complaints which indicate tuberculin intoxication, such as feelings of weakness, of general malaise, etc. In using tuberculin the dose must be regulated so that either there is no such reaction or so that the patients feel exhilarated by the treatment.

One of the most interesting features in the treatment of pulmonary tuberculosis is connected with artificial pneumothorax. Two methods of procedure are used which differ in the technique of entering the pleural

cavity—the Brauer incision and the Forlanini 'stick.' The Brauer method is much more complicated and more burdensome both to patient and physician, but it has been proposed as the safer method. Nitrogen gas is allowed to enter the pleural cavity under controlled pressure; and the operation is repeated. All the details of the technique are well discussed in Hamman and Sloan's article, and discussion of the technical part of the method in this review will be left out. In the reviewer's opinion not even the most enthusiastic reports have proved that the method is either simple or without danger.

From a practical standpoint, one of the most important facts to be considered is the selection of the proper cases for the treatment. So far most of the patients on whom artificial pneumothorax has been performed have been advanced cases that have not been influenced by the usual methods. The choice of an ideal case would rule out patients with active bilateral lesions and those with pleural adhesions. These restrictions eliminate the larger percentage of cases, and not enough early cases have been operated upon to allow valuable statistics to be gathered. The presence of pleural adhesions makes the operation extremely difficult and often impossible. In some cases of hemorrhage, artificial pneumothorax has acted remarkably.

What is accomplished by this procedure? Artificial pneumothorax produces a very marked fibrosis of the lung tissue. This fibroid tissue formation not only encapsulates an old lesion, but inhibits the development of new lesions in the affected lung. At the same time it causes functional rest of the diseased area, and probably a compensatory hyperemia of the other lung. Such conditions from a pathological standpoint form an almost ideal therapeutic result. Clinically the cough and expectoration are reduced, and general symptoms disappear. Hamman and Sloan summarize the situation as follows: "While induced pneumothorax will never become a routine method for the treatment of pulmonary tuberculosis, still in selected cases it offers a prospect of temporary and permanent relief when the usual methods of treatment have been unsuccessfully tried. Quiescent lesions in one lung with acute recrudescence in the other are the most favorable for the treatment. Its use need by no means be limited to strictly unilateral lesions, but when there is advanced disease of both lungs little benefit can be expected. It would seem advisable not to withhold the treatment until the patient is hopelessly advanced, but to apply it judiciously to suitable moderately advanced patients in whom the disease tends to progress in spite of appropriate treatment."

DIAGNOSTIC AND THERAPEUTIC NOTES.

RADIOSCOPY OF THE DUODENUM.—David (*Zentralbl. fuer inn. Med.*, No. 21, 1913). Instead of having the patient swallow a bismuth suspension, in the usual manner, and then watching, on the screen, its passage through stomach and duodenum, David fills the duodenum directly. He inserts a modified Einhorn duodenal tube and when, by means of a screen examination, he has satisfied himself that the tube is in position, he injects a bismuth suspension directly into the duodenum. The latter then appears sharply outlined not only against the intestine, but against the stomach itself, and can be studied, as regards function and position, with great accuracy.

BEHRING'S NEW DIPHTHERIA PROPHYLACTIC.—Von Behring (*Deutsch. med. Wochenschr.*, No. 19, 1913); Schreiber (*Ibid.* No. 20, 1913); Zangemeister and Viereck (*Ibid.*, No. 21, 1913). At the German Congress for Internal Medicine, at Wiesbaden, in April, Behring described a new method of immunizing human beings against diphtheria. The present method leaves much to be desired, since it depends upon the injection of a foreign serum. The result is that the immunity lasts but a short time, as the foreign proteids are rapidly eliminated and that repeated injections involve the risk of anaphylactic attacks. Behring now proposes to confer immunity to diphtheria by means of the injection of a mixture of diphtheria toxin and antitoxin, the object being to permit the toxin to cause the production of immune-bodies in the child's own organism, while the antitoxin, simultaneously injected, protects him. Theoretically, an immunity so produced would be at once far more intense and far more durable than one following the injection of the ordinary antitoxic serum.

It has been a matter of some difficulty to find the most suitable proportions in which to mix the two ingredients. Numberless animal experiments have shown that whereas the proportion of antitoxin, that will just render the toxin harmless, is very constant for most species of animals, it varies greatly from one species to another. It is no simple chemical combination. Thus monkeys require several hundred times as much antitoxin to neutralize a unit of toxin as guinea-pigs. Human beings are fortunately not so sensitive.

The prophylactic mixture has been tested in the clinics of Schreiber at Magdeburg and Zangemeister at Marburg on children as well as on adults. The reactions were usually very slight or entirely absent, and the patient's serum after the lapse of two or three weeks contained a varying but considerable amount of antitoxin, always enough to furnish a satisfactory protection. Occasionally the reaction, though never alarming, was a little more violent. It was then invariably followed by the production, in the patient's blood, of unusual quantities of antitoxin. Thus

in one child, the blood was found to contain 600,000 antitoxic units. Such quantities are of course unnecessary, since ordinarily 250 units suffice for a satisfactory protection. Some serum was withdrawn from this child and injected into another. This is the first time a passive immunization with human diphtheria antitoxin has ever been carried out.

One disadvantage of the new method is the long interval required before the immune bodies are produced by the organism. Not only is the individual not protected during the interval, but it is even possible that there may be a preliminary 'negative phase' in which his resistance to the infection may be subnormal. Moreover, time alone will tell how complete and how persistent the resulting immunity is.

TEST FOR BILE PIGMENT IN BLOOD AND URINE.—Pakuscher and Gutmann (*Med. Klinik*, No. 21, 1913). The reagent is ether containing 0.5 per cent. of iodine. To 5 c.cm. of urine 1 c.cm. of the reagent is added and the mixture shaken thoroughly. On standing, two layers form, an upper brownish, ethereal one and the lower urinary one. The latter is colored green if bile be present. If now the ethereal layer be poured off and the urine shaken up several times with fresh ether, so as to remove the excess of iodine, the green color becomes still more marked.

To demonstrate the presence of bile-pigment in the blood, 2 c.cm. of serum are shaken up with 3 c.cm. absolute alcohol and filtered. This removes the albumin. To the filtrate, add a few drops of 25 per cent. HCl, 2 c.cm. water and 0.5 c.cm. of the reagent. Shake and, if necessary, again remove the iodine by repeated shaking with fresh portions of ether. A green color, in the watery layer, indicates the presence of bile-pigment.

LONG CONTINUED INTRAVENOUS INFUSIONS.—Friedmann (*Muench. med. Wochenschr.*, No. 19, 1913). In cases of decompensation, adrenalin and digalen may advantageously be added to physiological salt solution and the mixture given intravenously, drop by drop. The period of continuous administration may extend over an hour or more. This method appears to possess several merits. A considerable amount of saline fluid may be thrown directly into the circulation without embarrassing the right heart or causing a serious rise in blood-pressure. There is also reason to believe that cardiac tonics so administered are unusually effective: their action is longer continued and their toxic influence less than ordinary. Collargol, hormonal and other medicaments may be given in the same manner. Two precautions must be taken: the solutions must be sterile and the water used in their preparation must be freshly distilled.

DIFFERENTIAL DIAGNOSIS OF CONVULSION BY MEANS OF LEUCOCYTE COUNTS.—Joedicke (*Muench. med. Wochenschr.*, No. 20, 1913). A trustworthy means of differentiating between hysteria and epilepsy, and one that cannot be imitated is the behavior of the white corpuscles. While the latter show no change whatever after an hysterical attack, they increase greatly in number after a genuine epileptic seizure. Leucocytoses of 20,000 or over are not uncommon. They drop rapidly after the convulsions cease and soon attain normal values again.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

The remarkable paper, by Dr. Helen Chambers, dealing with the asserted presence of a new form of spirochæta in the blood of almost every person yet examined, to which I made allusion in my letter last month, has been published in the *Lancet* of June 21st, together with illustrative diagrams and pictures. In the *Lancet* of June 28th there are letters from three microscopists of reputation, who do not, however, appear to have seen Dr. Chambers' preparations, suggesting that what have been taken for spirochætæ are really either artefacts or appearances due to some "physical forces analogous to those which are responsible for the phenomenon of Brownian movement." Dr. McLeod makes particular reference to the *formes parasitaires ou pseudo-parasitaires* described by Gastou in his recent brochure on "Les Actualités Médicales." Dr. Andrew Balfour, of Khartoum, has little doubt but that the figures described are but those dealt with by him in his paper on Fallacies and Puzzles on Blood Examination. On the other hand, quite a number of good observers do agree with Miss Chambers' interpretation of what she has seen and described. There, for the moment, the matter must rest. But it is impossible to deny that quite a number of people, especially by the aid of the ultra-microscope, have seen, in the blood, figures that are dubiously organic, not dissimilar to those seen by Courtade in the dry deposit from expired air. It is equally certain that old Béchamp would have seized on these observations as proof of the correctness of his notions concerning the 'microzymas'!

Amongst the many medical societies in London, that known as the West London Medico-Chirurgical Society holds a very honorable place. Founded some thirty years ago by the late Mr. Keetley, and having headquarters at the West London Hospital, it is remarkable as embracing, amongst its 700 or more members, general practitioners and consultants in almost equal proportion. Its officers are chosen representatives of these two branches of the profession; and its president is, in alternation, derived from one or other group. This year the latter office has been excellently filled by Dr. Shuter, well known as an anesthetist, and last night there was held, under his auspices, what has come to be one of the most important medical 'functions' of the professional year—the *conversazione* annually given by the Council of the Society, together with the delivery of the Cavendish lecture, founded in pious memory of Cavendish, the physicist and investigator. This year the lecturer was Sir Berkeley Moynihan, of Leeds, who spoke for an hour, without notes, and with the completest mastery of his subject, concerning the Surgery

of the Large Intestine. Sir Berkeley's oration, which was one of the most lucid to which I have ever listened, was as remarkable for the aphoristic force of almost every sentence as for the matter actually presented to us. It will appear in the *Quarterly Journal of the Society* which will be published next week. The orator, who restricted his remarks to questions connected with tumor, and with diverticulitis, took early occasion to insist that the surgeon of to-day is one who thinks as well as cuts; who uses his intellectual powers to discover early manifestations of disease, and then bends them to the task of enabling him to carry out what are mechanical procedures.

Although, as Sir Berkeley went on to say, it is gratifying that the progress of knowledge allows the surgeon now, more easily than hitherto, to remove in their entirety and with safety even the largest tumors, still progress in the art of precocious diagnosis is slow, and it is too sadly true that terminal events afford the surgeon his chiefest opportunity.

To the end that the art of precocious diagnosis be advanced, symptoms must be considered. And the opinion was expressed that symptoms depend, in the case of disease of the great bowel, very largely on embryological facts for their interpretation. The alimentary canal is of course divided, embryologically, into foregut, midgut, and hindgut. The functions of these sections differ; the foregut prepares, the midgut adjusts, and the large gut stores the residue of what enters it. But the midgut terminates and the hindgut commences halfway along the transverse colon. The function of the large bowel is therefore diverse: with the first part 'we eat' and with the second 'we drink.' That is to say, the contents of the cecum and ascending colon are fluid, while those of the hindgut are solid. So that, if growth occurs where the contents are fluid, stenosis soon develops; there is exaggerated peristalsis, and diarrhea is a frequent symptom. On the other hand, when the hindgut is implicated, stenosis is tardy in occurring, though constipation is an early indication of disorder.

A curious point mentioned is the frequency with which those suffering from disease of the large bowel possess the power of localizing the site of their troubles. Amongst the clinical indicia differentiating malignant disease from the condition known as chronic diverticulitis, Sir Berkeley is inclined to rank importantly the occurrence of bloody stools. And he proceeded to expound this subject of diverticulitis, to which, indeed, he first drew attention in most interesting fashion. Diverticulitis—a condition characterized by the occurrence of hernial protrusions through the wall of the large intestine at points where the wall is weakened by the presence of a vessel—comes before us surgically in the guise of (1) perforation, with or without the formation of abscess, and the occurrence of intestinal or bladder fistulæ; (2) as a cause of general peritonitis; (3) as what is sometimes called 'left-sided appendicitis'; (4) sometimes as a thickening of the bowel wall, of protective nature, simulating malignant disease; and lastly (5) as an actual precursor of carcinoma.

Turning to the questions of practical surgery involved, after giving us a fine demonstration of specimens by means of the lantern (and amongst those shown were some sent by W. J. Mayo), some considerations were put forward which a physician can only report with hazardous temerity.

But the importance of the anatomical structure recognized by Waldeyer as the "marginal artery of the colon" was emphasized, and the relations of it to the superior hemorrhoidal artery were clearly explained. The

bearing of these anatomical questions on the occurrence of gangrene after some cases of Kraske's operation were alluded to, as well as the actual difficulty if not impossibility in bringing about gangrene of the whole colon!

Leaving this topic, it was suggested that, in planning operations for the removal of all trace of malignancy, too much importance is sometimes attached to consideration of the lymphatic system as it appears in the fetus; and it was declared that many surgeons do more than is necessary in the removal of outlying glands, and not enough in the way of local excision. But, in considering the actual resection of growths, it was laid down that the first step is to mobilize the bowel by restoring the anatomical fetal conditions, and the second, then to displace it.

One other dictum from this admirable lecture must be quoted to the effect that, when feces and flatus are passed by the urethra, the underlying condition is always that of chronic diverticulitis. Perhaps nothing is more enjoyable or profitable than the reception of instruction imparted at first hand by a master; and everyone who listened to Sir Berkeley Moynihan felt, I know, that, in hearing facts from him directly, they had learned something that ink and paper had never before conveyed to them.

PRACTICAL MEMORANDA.

By WILLIAM T. COUGHLIN, M. D., of St. Louis.

For a long time we have noticed, in the European medical press, reports of the wondrous results obtained in the treatment of typhoid fever by tincture of iodine. According to Arnozan and Carles it was Raynaud, in 1904, who first called attention to the value of tincture of iodine and counselled its use in this disease. His results in a large series of cases were 90 per cent. cured in from twelve to fourteen days. He used the following formula: Tincture of iodine, 20 to 25 gtt., iodide of potassium 1 cgrm. and water 150 grm. This was given daily in divided doses and with water added.

Arnozan and Carles, knowing that iodine locally increases the leucocytes and that in typhoid the leucocytes are diminished, reasoned that therefore iodine ought to be of value in typhoid. As to whether their cases actually showed increase in the leucocytes, they leave us quite in the dark, but they report 44 cases so treated with four deaths. Of course, it is shown that these four were justified in dying from causes other than the iodine, and, of course, they used all other usual means to control the course of the disease.

Will not some of our medical colleagues take it up and try it out in American fashion?

Prolapse of the cord is often the cause of death of the baby and it should always be thought of and sought for at the first examination. It descends in advance of the presenting part most often. Once head or breech has engaged in the os, it is not likely to occur. Hence, if it be replaced and held in the uterus until the presenting head or breech be engaged in the os, all will be well with the child; if not, the child will almost surely be asphyxiated during delivery. The course to pursue in the case of prolapse of the cord must be decided by the physician in charge, and he must decide and act quickly. If the cord is being pressed upon and the fetal heart is still beating, there can be no doubt but that quick removal of pressure from the cord or delivery is indicated, that is to say, either the cord must be quickly returned into the uterus or the child must be quickly delivered.

Of course, if one is satisfied that the child has been dead some time, there is no need to interfere for prolapsed cord.

To return the cord into the uterus various methods are used, but the following is most used in this country and in England: Encircle the cord with a loop of tape or string, the loop not to be more than $1\frac{1}{2}$ in. wide. Now take a catheter with stylet in place. Withdraw the stylet far enough to leave the 'eye' of the catheter free. Pass an angle of the loop into the 'eye' and push the stylet through it and on 'home.' The loop

is now held to the catheter by the stylet. The catheter carrying loop and cord is now pushed well up into the uterus and released there by withdrawing first the stylet and then the catheter.

A colleague recently called attention to the fact that someone has objected to the use of iodine sterilization of the skin in laparotomy cases on the ground that its use increases the liability to adhesions. It is puzzling at first to see how this could be, but the idea is that the iodine gets onto the peritoneum covering the intestine; this happens only if the operator handles the skin and then the viscera, or else allows viscera to come into direct contact with the skin. If one would observe the following cautions he might continue to use iodine until doomsday and never increase the liability to adhesions: Apply pure tincture of iodine with gauze and do not roughly scrub the skin with it. After five minutes wash off the iodine with 90-95 per cent. alcohol until the skin is pale yellow in color. Cover the abdomen with two towels, the edge of each of which will be parallel with the line of incision and half an inch from it; two other towels are put on across these, one passing above the upper and one below the lower end of the line of incision. Fasten the towels to the skin with Backhaus clips.

After the incision is made two other towels are fastened, one on each side, either to the skin itself in the wound or else to the aponeurosis. Never allow fingers to come in contact with the skin. Be gentle in handling viscera, and if they must be brought outside the abdomen, let them come in contact only with towels or sponges rung from a saline solution.

Be careful in making a diagnosis of Raynaud's disease and remember that the lesions in that clinical entity are usually bilateral, while in syphilis there is such a thing as local arteriosclerosis with endarteritis obliterans, and see that you do not cut off a leg for Raynaud's disease when potassium iodide will cure it. Intermittent claudication is often a symptom of such luetic arteriosclerosis. And remember that luetic arteriosclerosis can occur either in the upper or lower limbs.

Rissman and Echmann claim to have obtained excellent results in the toxic dermatitis of pregnant women by the intramuscular injections of Ringer's solution. The following is their formula for the solution: Sodium chloride 1.80 grm., calcium chloride .048 grm., chlorate of potash .084 grm., sodium bicarbonate .06 grm., distilled water q. s. 200 grm.

Be sure to make a complete intrapelvic examination in every case of sciatica. This is the time of the year when typhoid is sometimes mistaken for appendicitis. The blood examination will aid in making the differential diagnosis.

Another cure for gonorrhea has been discovered. This time colloidal iodine. It is used as an injection, and by Mirtle and Touffier is said to cause disappearance of the gonococcus from the urethra in two days.

BOOK REVIEWS.

DIE NEPHRITIS. Eine experimentelle und kritische Studie ihrer Natur und Ursachen, so wie der Prinzipien ihrer Behandlung. Von Dr. Martin H. Fischer, Eichberg-Professor fuer Physiologie an der Universitaet Cincinnati, Ohio, U. S. A. Mit Autorisation des Verfassers in deutscher Sprache herausgegeben. Von Hans Handovsky, Wien, und Wlfg. Ostwald, Privatdozent an der Universitaet, Leipzig. Dresden: Verlag von Theodor Steinkopff. 1912. Price, 6 m.

The work of Fischer has already received extended notice in the pages of the Journal (Vol. XIX, No. 12, 1912). The present book won the Cartwright Prize of 1911 in Columbia University and is a contribution of Fischer's ideas, on edema and water retention by the tissues, to the special problem of nephritis. The first part of the monograph is given over to a discussion of the cause of albuminuria. This, says Fischer, is brought about by an increased acidity of the kidney which changes the insoluble albumin (gel) of the kidney parenchyma into a soluble albumin (sol), in the same manner as the change can be brought about in the test-tube. Attempts to produce albuminuria in animals by injecting acid solutions into the circulation were successful. The latter part of the book is devoted to the treatment of nephritis. Here is set forth the recommendation, so diametrically opposed to our prevailing ideas, that sodium chloride should be used to control the edema and the nephritis. The book is full of suggestive thought and is well worth reading.

THE PRINCIPLES AND PRACTICE OF MEDICINE. Designed for the Use of Practitioners and Students of Medicine. By Sir William Osler, Bt., M. D., F. R. S., Fellow of the Royal College of Physicians, London; Regius Professor of Medicine, Oxford University, etc. etc. Eighth Edition—Largely Rewritten and Thoroughly Revised with the Assistance of Thomas McCrae, M. D., Fellow of the Royal College of Physicians, London; Professor of Medicine, Jefferson Medical College, Philadelphia, etc. etc. New York: D. Appleton and Company. 1912.

The present edition of this classic textbook has been revised in keeping with the growth of our medical knowledge during the past few years. The latest advances in the study of typhoid fever, especially its bacteriology and prophylaxis, the additions to our rapidly growing knowledge of syphilis including the salvarsan treatment, and the newer work in the treatment of pulmonary tuberculosis, especially artificial pneumothorax, receive due attention. Chapters on kala-agar, the sporotrichoses, pellagra, ochronosis, hemachromatosis, and especially the valuable work on disorders of metabolism which are receiving so much attention have been newly written or much enlarged. The chapter on circulatory diseases also attracts notice by embodying the later facts which our finer diagnostic instruments have brought to light. The book deserves to continue its enviable reputation, and to be read "by young people of all ages."

INTERNAL MEDICINE. By David Bovaird, Jr., A. B., M. D., Assistant Professor of Clinical Medicine in the College of Physicians and Surgeons of Columbia University, etc. etc. With 109 Illustrations in the Text and 7 Colored Plates. Philadelphia: J. B. Lippincott Company. 1912. Price, \$5.00.

In his textbook the author has aimed to give in a concise manner the essentials of internal medicine, avoiding on the one hand the usual catalogue character of the shorter works, and, on the other, the great mass of facts, bewildering to the student, which are common to the larger works. As an aid in the presentation of his subject the author has made use of numerous photographs of clinical conditions and illustrations of methods of diagnosis and treatment. The chapter on diseases of the heart includes the knowledge obtained through the more recent studies with the sphygmograph and electrocardiograph. The book of some 600 pages recommends itself as a most useful one for the beginner in medicine.

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EDITORIAL.

A DOCTOR'S REAL DILEMMA.

Who has not heard the remark, repeated perhaps so often that to-day it has no longer the freshness of youth, that of all men in the battle of life the doctor ranks first as a very poor business man, and that despite advice, sometimes sought but more often gratuitous, he persists in his stubborn ways with the result that in the race after wealth his is a very poor showing, indeed. Of course, it may be cited as a counterblast to the persistency of this thought that there are even instances in the medical world where a doctor has been so bitten with a desire for wealth that his science is a mere handmaid to his commercial instincts. But though this is true in isolated instances, the truth must force itself upon us that the torch-bearers in the commercial world know so much more of the art of accumulating money that even the most commercialized doctor is a child of full-blown innocence by comparison. And this being the case, would it not be well for the whole medical profession—of course, with the exception of those bright particular stars who have sparkled for many a day in the miasm above degraded commercialism—to mend their ways and see the folly of the deprecatory course which in their old age must bring to them perforce only a harvest of tares?

How should a doctor go about collecting a bill from a patient and still command that patient's respect? Is he justified to send the bill directly he thinks his services are at an end, or should he wait a month or two so as not to irritate his patient's finer sensibilities? And what if a complication, rather latent, should set in the day his bill arrives? Are not these questions of great moment, and has not every doctor, whether young or old, encountered them? In truth, he has; but what unanimity of opinion exists as to the answers? One doctor will say that

he is so sure of receiving his emolument that he generally waits until deep gratitude on the part of his patient impels him to rush into the office and amidst vociferations of thankfulness thrust more than the bill would have been into the reluctant hands of his benefactor? Another, less hopeful, will say that human nature being less noble than formerly—this remark is generally founded on a knowledge of the history of the human family gleaned from the writings of some penny-a-liner—it will never do to wait too long; for invariably that is done the doctor is the loser in more ways than one—the patient overlooks the account with a regularity that is almost incurable, and when the thumbscrews are called into play in the shape of a formidable collector and he does pay, he is prone to remark that anyone who is remiss to the extent of not sending a bill at once declares his inability to appreciate the value of money. Those two cases are extreme, but must it not be admitted that in the stretch which lies between them there are many doctors of various moods and wishes, of small bank accounts and threatening grocers' bills, of youthful enthusiasm and high resolves, of growing families and greying hair, who are always in a dilemma lest by a show of too much eagerness for a return for their services they will militate against their best interests? And these interests cannot be too lightly judged, for even the loss of one supersensitive patient whose outraged feelings are still bleeding from the bludgeon dealt by the doctor's unexpected bill may be the beginning of other patients, heretofore pachydermatous, developing a very thin skin, one bell-wether being all that is necessary. What the proportions of the outcry against such awful avarice may be every medical man, who has passed scathed or unscathed through this ordeal, surely knows. And of assistance in making the first faint whisperings tones of a reverberating nature, there is generally the man around the corner, who wears an exterior of austere medical science, but whose interior is just as readily set aglow by the possibility of a good fee as are the exterior and interior of his less careful brother in the medical ranks, but who is circumspect enough not to warm his hands too publicly at the fire of commercialism.

Without doubt, what has just been written is a doctor's real dilemma; for if he wants to succeed as a scientific entity in the eyes of his critical, but not always truthful, confrères he must at least outwardly shun the lure of money, and if he hopes to gain the respect of a goodly number of his patients, as well as their admiration on account of being appreciative of that innate refinement that rebels against too sudden an onslaught on their purses, he must not think too tragically of the dreary passing of time. But are these problems so easy of solution that a word dropped here and there by an interested friend—a casual comment, so to speak,

that is o'erlaid with good advice—can be effective in bringing about an *entente cordiale* between the doctor and patient so that the measure of commercialism that the former wishes to exercise in his own interests will not be misinterpreted? We hardly think so; and yet if we are to believe what is contained in a book* on this subject, which has recently been published, these problems may be dissipated as if by a magician's wand. But granting the author the praise which should be the reward of all earnest efforts to help the uncommercialized doctor toward that goal which is sought after and generally reached by the business man, the passages which should buoy up our spirits are so decidedly detached from what really takes place in the sphere of medical actualities that the optimism must strike one at once as being the sort of soothing salve most authors employ when they wish to pose as serene spirits in a world of misunderstandings. Let us take one sentence which is not extraordinary in this book but in line with many others: "A fundamental principle in being a good collector is to never lose the good will of your patrons. So long as you are on friendly terms with a man you can approach him and talk over the matter. It will be easy to keep advised as to what he is doing, and when he is expecting to receive money." Could naïveté go further? and has ever a sentence been indited that contains so many titbits of thought that are wholly inapplicable? But perhaps a few past experiences, unknown to others, have so blunted our perception of the willingness of patients to pay promptly that we are still in doubt whether the most effective means to get our deserts is a gentle expression of the epistolary art, as illustrated when Dr. Davis writes in a letter that is a sample of the sort a doctor should send to a patient who has failed to keep his promise to pay—"I hope that you are well and prosperous, and that little Mary has fully regained her strength," or a threat to sue or even take the law into our own hands. Of course, the last procedure would be hopelessly vulgar, but should refinement be expected when a violation of a promise has been perpetrated?

ARTISTS AND DOCTORS.

It might seem to be a far cry from the pencil and palette to the medicine chest and instrument cabinet, but such is not the case. From time immemorial the members of the medical profession have shown a deep interest in, and an intelligent appreciation of, art—an appreciation which is more serious and more virile than is met with in any other vocation or profession outside the actual calling of the artist.

*How to Collect a Doctor Bill. By Frank P. Davis, M. D. Newark, N. J.: Physicians Drug News Company.

There are reasons for this: The same qualities and singular union of gifts, which, for example, are needed to make a master-surgeon are also necessary to make a master-artist. The habit of observation, the training of the eye, the delicacy of touch, the deftness of hand, the knowledge of anatomy, and the brilliance of imagination, are all as necessary to the one as to the other. Granting this, we can understand why many eminent surgeons have been skilful artists, and why some few, like F. Seymour Haden, have renounced surgery in order to follow art.

Nor has the exodus been entirely onesided. The annals of medical history show that many painters and engravers have become members of the medical profession. J. F. Gautier d'Agoty (1717-1786), of Marseilles, employed himself diligently in the study of natural history and of anatomy; he wrote treatises on botany and zoölogy; and applied his skill in color-printing to the illustration of the anatomical monographs which were left unfinished by the death, in 1730, of J. G. Duverney, professor of anatomy at Paris. Gautier made the necessary dissections, drew the pictures, engraved the copperplates, printed the illustrations in colors, and even supplied the text. While the result was not satisfactory from the standpoint of science, we must recognize the good intentions of this industrious individual.

Antonio Veneziano, or Fiorentino, a noted artist who became interested in botany, chemistry and medicine, in his later years exchanged the pencil for the scalpel. He did noble work during an epidemic of the plague which ravaged Florence in 1383. In more recent times, Jacob Lange, a Nuremberg artist of note, after his fiftieth year received his degree from the University of Altdorf and thereafter practised as a physician.

Haden was not the only surgeon who left the operating room to enter the studio. The celebrated Romyn de Hoghe, a Swiss physician and surgeon, became well known in his day as an artist. Among the practitioners of surgery who brushed the canvas with good results were Raymond la Fage and Jacob Ruysdael. La Fage's works show an accurate knowledge of anatomy. Ruysdael, who is famous as a marine and landscape painter, in his early days studied medicine and practised surgery in Amsterdam. Jacob van Liender, of Utrecht, painted in water colors, much after the style of Poussin. A French physician, Philip de la Hire, son of the astronomer, was so skilful in the use of the colors that his admirers wished him to give his entire attention to art.

The artistic skill of physicians has been extended to fields other than medical. Thus, Wolfgang Lazius cut the copperplates which adorn his works on history and numismatics; and Johann Cuspidianus, physician to Maximilian I., drew and engraved the earliest maps of Hungary and

Austria. The first map of Moravia is credited to Paul Fabricius, physician to Ferdinand I. And this does not exhaust the list of medical map-makers. The practical application of art to the illustration of medical, surgical, and anatomical subjects demands a high degree of intelligence. In the making of anatomical drawings, for example, great care is necessary in order that the picture shall show exactly what the author wishes to exhibit. If the technical rules of art are followed too closely as regards perspective, foreshortening and rounding, the illustration may conceal the very structures which should be portrayed. The picture should not be too diagrammatic, nor should it be burdened with accessories—such as landscape, clouds, and architecture, all of which disfigure some of the anatomical plates made in the sixteenth century. In the field of medical illustration art must be governed by text.

From the time of Andreas Vesalius (middle of the sixteenth century) almost to the present day, the Fathers of Anatomy and their successors, who have sought to illustrate their works with accurate engravings, have complained of the difficulties that they have met. Casserius, Valsalva, Morgagni, Albinus, and Haller have criticized their artists.

The shortcomings of artists, who have attempted to illustrate anatomical and surgical treatises, have been so vexatious that not a few authors have desperately cut the Gordian knot and have acted as their own artists and engravers. The beautiful anatomical plates of Eustachius, which were the earliest examples of the application of copperplate engraving to anatomical illustration, were the handiwork of this famous Italian anatomist. Finished in the middle of the sixteenth century, unfortunately they were lost for a period of one hundred and thirty years.

The celebrated Lorenz Heister, whose "Surgery" was the accepted textbook in Germany for more than a century, made the drawings and copperplate engravings for many of his works. Joseph Lieutaud, physician to Louis XVI., cut the six plates which accompany his "Essais anatomiques," Paris, 1742. Williamten Rhyne, of Deventer, and Arend Cant, of Dordrecht, noted Holland physicians of the seventeenth century, also used the graver's tool. Pieter Camper, eminent as surgeon, anatomist and obstetrician, gained manual dexterity by using the lathe and joiner, and made the drawings which J. van der Schley engraved for the elephantine folio, "Demonstrationum anatomico-pathologicarum," Amsterdam, 1760. Georg Bartisch, an early German ophthalmologist, who said that a physician "becomes more ingenious and meditative through painting and travel," made the woodcuts for his "Augendienst," Dresden, 1583, and himself illuminated many copies of his book. There are numerous works on botany which have been written and illustrated by physicians.

A more pleasing part of our subject concerns the debt—generally grate-

fully acknowledged—which artists owe to members of the medical profession. It was Ruskin who said that Turner's true master was Dr. Munro, a wealthy London physician, residing in Adelphia Terrace, who taught, fed and supported young and struggling artists in his home. When Hogarth was engaged in writing his "Analysis of Beauty," he received assistance from Dr. Benjamin Hoadley and Dr. Morell.

Artists have shown their gratitude to doctors in various ways. An allegorical picture containing the portrait of M. Daviel was painted by F. de Voge as a thank-offering and tribute to the skill of a noted ophthalmic surgeon. That Claude Mellan was a grateful patient is shown by his portrait of Joseph Trullier, a Roman physician who saved the artist's life. There are many portraits of physicians which were cut in copper by appreciative patients. The donation of works of art, or of alleged works of art, to physicians by patients is a common custom, and one which, it is feared, sometimes gives much pain to the recipient. At rare intervals, however, the gift shows a happy combination of gratitude with good taste. Such was the case when the Duke de Villeroi commissioned J. Chevalier to paint the portrait of Francois Quesnay, the first permanent secretary of the Academy of Surgery in Paris, and employed J. G. Wille to engrave it in copper. The result is beyond reproach. The debt which art owes to anatomy is pregnant with luminous facts, but space forbids an elaborate discussion of this subject.

Often it has occurred that anatomists and artists have worked together toward a common end, and the close friendships resulting from such coöperative labors are not only interesting, but they reflect the highest credit, upon the participants. Affiliations of this kind, for example, existed between Leonardo da Vinci and Marc Antonio Della Torre, Michael Angelo Buonarrotti and Realdus Columbus, Benvenuto Cellini and Berengario da Carpi, Jan van Calcar and Andreas Vesalius, Gaspar Becerra and Juan Valverde di Hamusco, Pietro da Cortona and J. M. Castellanus, G. Vandergucht and William Cheselden, Sir Robert Strange and William Hunter, Giovanni Battista Piazzetta and Gian Domenico Santorini, Jan Ladmiral and Bernhard Siegfried Albinus, Christian Kœck and Samuel Thomas von Soemmering, and between Antonio Serantoni and Paolo Mascagni.

We almost unconsciously associate the name of Rembrandt with that of Tulpius, President of the Surgons' Guild of Amsterdam; Joahn van Neck with Frederick Ruysch; Michiel Mierevelt with Willem van der Meer; and Thomas de Keyser with Sebastiaan Egbertsz.

Relations of this kind, which have long existed between the masters of painting and professors of anatomy, prove the mutual dependence of art and anatomy. The practical outcome of such joint labors justifies the

assertion that the debt which anatomy owes to art is surpassed only by the obligation which art owes to anatomy. In every epoch, the most remarkable and the most valuable treatises on art-anatomy have been those in which artists and anatomists of practically equal merit have been engaged; or, they have been produced by one rare individual who combined in his own person the artist and the anatomist. Many of the most famous painters of the fifteenth and sixteenth centuries were skilful dissectors, and not a few anatomists have been able draughtsmen.

Mention has been made of the long-lost copperplates of Eustachius, who was one of the fathers and founders of anatomy. The history of these beautiful illustrations, which were finished in 1552 and published in 1714, calls to mind the fate of two sets of anatomical drawings, each of which was the work of a highly esteemed artist. The copperplates made from the designs of Pietro da Cortona (Berrettini), and the anatomical illustrations contained in Rubens' sketch-book appeared in printed form many years after the demise of their makers. Berrettini's plates, which are noted for their strength and individuality, belong to the early part of the seventeenth century, the first of the series bearing the date 1618. They were published in 1741, and again in 1788. Rubens's sketch-book, containing numerous anatomical figures, appeared in print in 1773, one hundred and thirty-three years after the death of this master of art. Long delayed as were these interesting sketches, they cannot be compared, either in scientific worth or duration of concealment, with the wonderful anatomy figures which the versatile Leonardo da Vinci made in the heyday of his power, and which rested quietly in the recesses of various continental libraries for a period of more than four centuries!

OPINION AND CRITICISM.

THE HAPSBURGS AND THEIR LOVE OF DEATH.

No more interesting study can be imagined than to delve into the history of celebrated families and find out if possible why for generations a physical defect has obtained or why a certain mental bent should be apparent in every generation. This study, we take it, has fascinations that are supreme, for if once one puts his mind to it, the thrall is almost unshakeable. Now of all historical families, not excluding the Montmorencys who for generations bore the undesirable insignia of a squint, the Hapsburgs have enlisted the greatest amount of attention, not so much on account of stupidity or brilliance, but on account of the prognathism that has been translated into common parlance as the 'Hapsburg lip.' But if we pin our faith to what has recently been written* about this family, we must grant them an altogether different distinction—a mental twist that was manifest in all the Spanish Hapsburgs from Charles V., who was the son of Philip the Handsome and Joanna the Insane, to Charles II., the last of the Spanish line. This psychosis took the form of 'thanatophilia,' and that it was a real psychosis is evidenced in the lives of all the Spanish Hapsburgs, though it must be admitted that this undue love of death really started with one who was not a Hapsburg by birth—Joanna the Insane, the degenerate daughter of Ferdinand of Aragon and Isabella of Spain. It was this queen who, after her husband had been embalmed and buried in the Church of the Carthusian Friars at Miraflores, near Burgos, visited his tomb dressed as a religious and murmured supplications. All of a sudden she ordered the coffin to be opened and the shroud to be removed; then throwing herself on the body, kissed the feet and hands, meanwhile declaring aloud her imperishable love for her husband. This visit was not unique, for periodically the queen would return to the tomb to gaze upon the body. But she soon tired of these almost daily visits, and, having ordered the body to be carried to the king's former bed-chamber, had it placed on a bed of state after it had been dressed in magnificent clothes. Finally, she was persuaded to have it interred in the Capilla Real in Granada; and when it is recalled that it took the funeral cortege some two months to make the journey, that consent was wrung from her only on condition that she would be allowed to accompany it, that according to her strict orders the journey was to be made only at night because a widow who had lost the sun of her soul could never again show herself in the light of day, and that at every church a halt was made so that the coffin could be opened and prayers for the dead said, it can readily be understood that this queen indulged her psychosis to the full. But although one would expect the finest exhibition

**L'Amour de la Mort chez les Habsbourg. Contribution à la Pathologie historique.* Par Docteur Paul-R. Mersey. Paris: Ollier-Henry, Editeur. 1913.

of this extraordinary phase of mental pathology in one who had been dubbed 'the Insane,' yet it can be asserted with truth that all her descendants were more or less afflicted with a morbid love of death, a desire to be in close proximity to tombs and participate in funeral ceremonies.

The statement contained in this book that the Spanish Hapsburgs were degenerates on account of constant intermarriages may have some applicability to the royal families throughout Europe to-day, for consanguinity is not unusual even with them. Still, we must admit that if they have a psychosis it is much less objectionable than was that of the Spanish Hapsburgs; for if we have read their histories aright their joy of living is developed to so good a degree that they are apparently quite normal. Of course, the Austrian Hapsburgs may be inclined even to-day to prefer a visit to the tombs in the Church of the Capuchins to more exhilarating entertainment; but can the same be said of other royal families? We doubt it; and, while we must plead allegiance to democratic ideals, we are nevertheless fascinated by the inscrutable workings of Nature in effecting a constant readjustment even in royal families, so that what would otherwise be a psychosis of so startling a nature that irresponsibility would surely result, is of so mild a nature that it takes to-day only those forms which also attack the bourgeoisie—contracting debts, a positive weakness for dancers, and an unquenchable pride in family.

THE NEED OF BETTER VENTILATION.

The ventilation of public meeting rooms has been deplorably neglected, but it is a great satisfaction to notice signs of an awakening of public health officers. Architects have been so culpable that it really seems as though they should be required to obtain sanitary approval of plans of proposed buildings. Nor should any existing building be used for meetings unless approved means of ventilation are installed. The worst rooms are often the public libraries—the very places where the best ventilation is essential. Not infrequently one enters a fine marble pile of beautiful architecture, and is greeted by a foul, sickening odor which not only prevents mental activity, but which gives the reader a severe headache and other symptoms of poisoning. The sour odor of unclean school children is so overpowering that ventilation must be doubly effective, yet school rooms not infrequently are so poorly aired that there is a positive stench. No wonder the teachers have headaches and get 'nerves,' and the children catch about every known infection. We are quite sure that if the ventilation is so perfect that no odor is noticeable upon entering the room from outdoors, we will find not only a tremendous reduction of actual illnesses of the little ones, but also a wonderful improvement in general health and physique. The air conditions often found are amply sufficient to cause the pasty complexions and frail physiques now too common. There would be less need of outdoor school rooms if architects would take "outdoors" indoors—that is, make the room air as fresh as out-doors, and prevent overheating.

LITERARY NOTE.

In the matter of acquiring a command of foreign languages opinions are about as plentiful as the leaves in Vallombrosa. Every teacher who has evolved a method rushes, so to speak, into print, so that a public, that has grown a-weary over the unsatisfactoriness of a much-lauded system that has proved to be of few virtues but many faults, may seize upon the newer system and thus have the opportunity of an early and much-to-be-envied vintage. But disappointment soon follows, and the student finds out, not to his irreparable cost, but to his dissatisfaction, that the latest means to remove the stubbles in the path to an easy acquisition of words and accents is not so perfect as the pretensions of the author would lead him to suppose. Nevertheless, let us not be too severe on the books which accumulate from year to year on our shelves and which are quite strident in declaring to us that a mastery of any one will perfect us in the language sought. Let us not be too severe, for in each is something to learn with profit; and, while it must be admitted that the royal road to easy knowledge is somewhat exaggerated in all, there are with few exceptions enough good points in each to make the attentive reading thereof worth while. The three booklets by M. J. Lafitte entitled respectively "French Self-Taught," "French Grammar Self-Taught," and "Key to French Grammar Self-Taught" (E. Marlborough and Company, London) fit in with our criticism; for while the idea of learning French without a teacher has an appeal that cannot be overestimated by anyone who has toiled even with the most amiable teacher, and while these booklets teach a number of really important matters that have been overlooked by other teachers who have seen fit to put their thoughts on paper, for the reader to imagine for a moment that he can acquire an impeccable pronunciation or that in future conversations it will be easy sailing so far as the French verbs are concerned is really being altogether too sanguine of his own ability and too trustful of the value of the system exploited. But when this has been said the unpleasant criticism must stop, for on every page the painstaking endeavor to bring before the reader a simplified method of study is exemplified. When we recall the complicated older books that were thrust upon us with the message, as expressed by the authors in their prefaces, that if we would but study their methods carefully our difficult gropings through the intricate mazes of French verbs and French pronunciation would no longer obtain, we cannot withhold from the author the praise that clarity and conciseness should always call forth. But let no reader delude himself with the thought that that most difficult of all linguistic acquirements—a pronunciation of French words that will not tickle the risibles of a genuine Frenchman—can ever be learned from any book, no matter how unswervingly diligent he may be.

ORIGINAL ARTICLES.

CEREBROSPINAL MENINGITIS: SOME ATYPICAL MANIFESTATIONS AND A NEW DIAGNOSTIC AID.

By NOBLE P. BARNES, M. D., of Washington, D. C.,
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The epidemics of cerebrospinal meningitis in the southern sections of this country, the frequency of sporadic cases in large cities, the absence or late appearance of classical symptoms in the recent cases occurring in the District, a clinical manifestation not mentioned in the literature, and a new diagnostic aid are the writer's excuse for presenting this subject.

In 1805 the first clearly recognized epidemic of cerebrospinal meningitis occurred at Geneva, Switzerland. From 1806 to 1814 there were many outbreaks in widely separated localities in Germany and France.

The first recorded epidemic in this country was in 1806 at Medford, Massachusetts. The disease continued in different places on this continent until 1819. From 1836 to 1850 epidemics reappeared all over Europe. From 1842 to 1850 there were many small outbreaks in America. From 1850 to 1860 the disease was particularly active in the Scandinavian Peninsula. In 1860-61-62 Germany, Russia, Ireland and the United States were visited. For the next two decades there were few cases except in New York in 1872, and Boston in 1874. In 1885 and 1886 it ravaged various parts of Europe and the Fiji Islands. From 1896 to 1903 it reappeared in most of Europe and America. Washington had over 100 cases in 1901.

Another cycle of epidemics began about 1904 in the United States, 1905 in Germany, and 1908 in France. Records for 1911 and 1912 show that this last wave has not passed.

The intermission between epidemics is replete with sporadic cases that show no order of progression, but occur at widely separated localities simultaneously. The disease is more selective of children—about 75 per cent. being under fifteen years of age—and prevails in winter and spring (80 per cent.), but is indifferent as to climate, topography, commercial relations or social conditions.

While the study of these early epidemics furnishes a most elaborate and varied symptomatology, the real progress in determining the specific

cause was delayed until 1887, when Weichselbaum isolated the diplococcus intracellularis meningitidis.

The meningococcus, as it is now called, is the accepted etiological factor, although the final link in this proof has not been satisfactorily accomplished.

The meningococci are found in the cerebrospinal fluid, nasopharyngeal secretions and blood. Post-mortem they are found in the meningeal exudate and occasionally in the blood and viscera. In the spinal fluid their characteristic location is within the cells of the exudate, although they are not limited to this location.

Aniline stains are readily taken up by the meningococci. By Gram's process it is decolorized. This serves to distinguish it from streptococci, staphylococci, pneumococci and diplococci capsulati, any of which may produce a meningitis clinically similar to the epidemic form.

Failure to find the meningococci in the cerebrospinal fluid does not exclude positively the diagnosis of cerebrospinal meningitis. The inflammatory exudate may pocket the organisms higher up, but more frequently the delay in examining the serum has been sufficient to permit of the destruction of the meningococcus by the endogenous enzyme.

Too much stress cannot be laid upon the presence of the meningococcus in the nasopharyngeal secretions, most constant in early stages as shown by von Lingelsheim:*

First to fifth day.....	66.6	per cent.
Sixth to tenth day.....	24.56	per cent.
Eleventh to twentieth day.....	11.29	per cent.
Twenty-first day or later.....	4.39	per cent.

Netter and Debré** report 100 examinations from 49 patients as follow:—

First week.	78.33	per cent.
Second week.	60	per cent.
Third week.	50	per cent.
Fourth week.	25	per cent.
After fifth week.....	15.35	per cent.

These findings refer to pure cultures; and when we consider the difficulty experienced in obtaining pure cultures, it is safe to say that the meningococcus is always present in early stages and may persist for weeks or months after convalescence. Further, 'meningococcus carriers' have been found among persons who have been associated with cases of meningitis, among persons residing in communities where the disease is prevalent, and, rarely, among persons in the neighborhood where sporadic cases have occurred.

Albrecht and Ghon, in 1901, first isolated the meningococcus from the

**Zeitschr. fuer Hyg. und Infectiouskrankh.*, Bd. 50, pp. 457-483, 1908.

***La Méningite cérébrospinale*, pp. 42-43.

throat of a healthy person who had been in contact with a meningitis patient. Since that time many investigators have demonstrated the meningococcus in the nasopharynx of apparently healthy persons. In families or among men in dormitories where recent cases have existed there has been shown as high as 70.8 per cent. carriers.

Bruns and Hohn in Prussia, in 1907,* examined 3,154 healthy persons in the community where epidemics prevailed and found 465 carriers. Including only those families in which cases had occurred, 600 were examined and 224 were found carriers. Of 380 examined during and after the epidemics and not associated with any case, 30 were found carriers.

At Munich, in 1910, Mayer, Waldmann, Fuerst and Gruber** examined a garrison of 9,111 men, where there had been one or 2 cases of meningitis annually since 1908, and found 158 carriers. These last mentioned investigators classify carriers as follow: periodic, persistent, and temporary. They believe that like the pneumococcus, the meningococcus is almost ubiquitous in man. It is estimated that the carriers are probably ten times as numerous as the recognized cases. Outside the human body the organism is feeble and shortlived.

The primary seat of attack is believed to be the nasopharynx. The appearance of cerebrospinal meningitis, at the time of the year when influenza and pneumonia are prevalent, suggests the possibility of an assisting organism opening the way for the invasion of the meningococcus, and may, in this way, account for the variation in individual resistance. The early administration of antimeningococcic serum is now recognized as the only rational therapeutic measure. The serum is obtained from horses immunized by repeated injections of the autolysates, killed or live cultures. Therapeutically, it differs from the serums, the chief action of which is to neutralize soluble toxins. Its action is directed chiefly to the destruction of the meningococci. It is bacteriolytic, opsonic, and to a degree antitoxic. The endotoxins, set free when the meningococcus is destroyed by bacteriolytic or phagocytic action, are neutralized by the antitoxin present in the antimeningococcic serum. The action of the serum is therefore twofold—to destroy the meningococci, and to neutralize the poisons—a true assistant to Nature's method.

Inasmuch as its action is chiefly upon the cocci it must be brought into contact with them. Therefore, the injections must be made into the spinal subarachnoid space or into the ventricles of the brain.

The technique of lumbar puncture, the preparation, the assistants, the anesthetic, asepsis, etc., need not be discussed. It is important to remember, however, that the amount of fluid withdrawn must at least equal the amount of serum to be injected.

It is important to have a clear glass tube to receive the fluid in order

*Klin. Jahrbuch, Jena, Bd. XVIII, pp. 285-310, 1908.

**Muench. med. Wochenschr., Vol. 57, p. 1584, 1910.

that the gross appearance may at once be noted. It has been reported that no fluid at all is obtained in some cases that are chronic and where the meningeal exudate is thick and fibrinous. Personally, the writer would rather attribute this result to a small needle and faulty technique.

Injections should be made slowly and the patient carefully watched to avoid over-pressure. Repeated injections and subsequent treatment should be guided by results and the character of the spinal fluid. Sometimes a single injection gives surprising results, but unless the meningococci are killed a relapse may occur.

Netter and Debré recommend, as routine, three or four injections at intervals of twenty-four hours. The cerebrospinal fluid under the influence of the serum becomes clearer, the leucocytes degenerate less, the lymphocytes to some extent replace the polynuclear leucocytes, and the meningococci are diminished and less active.

The disappearance of the meningococci, according to Levy, is as follows:—

In 18 cases after 1 injection.

In 33 cases after 2 injections.

In 35 cases after 3 injections.

In 14 cases after 4 injections.

In 9 cases after 5 injections.

In 4 cases after 6 injections.

In 1 case after 11 injections.

The treatment must be prompt and vigorous. In any case, if cerebrospinal meningitis be suspected, a lumbar puncture should be made and the serum administered without delay. Even though later the bacteriological report shows the disease to be due to some other organism, the danger from the serum is slight as compared with the danger from delay in true cerebrospinal meningitis.

Results of the injection are, at times, unpleasant, alarming or even serious. These may be due to intracranial pressure, to the liberation of endotoxins by the destruction of the meningococci, or to the toxic action of the horse-serum. Of these the most important is intracranial pressure. The pain in the lumbar spine and lower extremities, the abdominal cramps and tenesmus may require morphine. For syncope and collapse prompt restorative measures are to be instituted. In over-pressure some of the serum should be allowed to escape. One of the cases herein reported developed convulsive movements, hurried breathing, feeble circulation, and died in a few seconds after infection.

Levy noted collapse in 16 out of 160 patients treated. Of these, 2 died at once, and 5 more during the course of the disease.

Symptoms, usually of short duration that follow shortly after injection, are restlessness, headache, erythema, twitching, and pain in the back and legs. The injection may be followed by a pronounced rise of temperature and exaggeration of symptoms, as in one of the cases here

reported. This may be due to the destruction of the cocci and the liberating of the endotoxin in large amounts. Later symptoms of so-called serum disease may manifest themselves, from the eighth to the fourteenth day after injection, as fever, urticaria and sometimes symptoms of relapse.

If in doubt do a lumbar puncture. Symptoms are likely to be more severe when a relapse makes it necessary to give the serum a week or more after the first injection.

Results of the serum treatment are well shown in Levy's statistics compiled from 165 of his own cases, and from cases reported by Flexner, Netter, Dopter and others. The total number treated with serum up to 1910 was 1,576. Mortality ranged from 18.18 per cent. to 42 per cent., averaging 26.12 per cent. In cases treated without the serum the mortality varied from 49 to 85 per cent., averaging 63.23 per cent. The reduction of the mortality to 26 per cent. does not emphasize what the serum can do, for many of these cases were moribund when treatment was commenced.

Early treatment is emphasized by analysis of the 712 cases reported by Flexner,* 99 reported by Netter and Debré from their own observations, and 402 reported by Dopter:—

Day Treatment Was Commenced.	Flexner (712)	Dopter (402)	Netter and Debré (90)
First to third.....	25.3	8.2	20.9
Fourth to seventh.....	27.8	14.4	33.3
After seventh.....	42.1	24.1	26.0

The most encouraging report made is from Netter and Debré: 44 cases injected before the third day with nine fatalities. Four of these were moribund when brought in, 3 others left apparently cured and returned in severe relapse. One had cardiac lesions. Excluding these cases, the mortality, based upon the 36 cases where the serum had a fair trial, was 5.55 per cent. Besides lessening the mortality, the serum shortens the course of the disease and reduces the proportion of such sequelæ as idiocy, paralysis, deafness and blindness.

Frost, of the Public Health and Marine Hospital Service, studied the epidemic at Savannah, Georgia, in the spring of 1911, where the serum was used by various physicians. He gives the following table:—

Treatment Begun.	Cases.	Deaths.	Mortality.
First to third day.....	11	5	45.5
Fourth to seventh day.....	6	3	50
Later than seventh day.....	4	3	75
No serum given.....	28	16	57

Defects remained after recovery in 18.8 per cent. of the cases in which serum had been used, and in 41.6 per cent. of the cases where no serum had been used. Of the 5 fatal cases that received the serum within the

**Journ. Amer. Med. Assoc.*, Vol. 53, 1909.

first three days, one was complicated with puerperal septicemia, one with whooping-cough and pneumonia: 2 received only a single dose, and the fifth received repeated small doses. Frost's summary, from the observations of those best qualified to judge, is as follows:—

1. The serum when promptly and properly used effects a very substantial reduction in mortality, shortens the course of the disease, and reduces the proportion of disastrous sequelæ.

2. It must be used freely—repeated daily for at least three days in most cases, and as much longer as may be found necessary from observation of clinical signs and examination of the cerebrospinal fluid.

3. The best results can be obtained only by persons expert in the technique and principles of the treatment and conversant with the clinical aspects of the disease.

During 1911 there were 8 cases of cerebrospinal meningitis reported to the District Health Department. Thus far in 1912 (October 27th) 5 cases have been reported. It has been the writer's good fortune to have seen all these cases, 4 in consultation and one in his own practice. These, with 2 cases in Hyattsville, make a total of 7 cases herein reported.

CASE I.—Seen with Dr. Guy W. Latimer at Hyattsville. Dr. Latimer has kindly furnished the following history: Mary W., *æt.* fourteen, taken sick with a chill. Patient seen three hours after onset. Temperature, 103° F.; respiration, 30. Irregularity not noticed. Pulmonary sounds negative. Twenty-four hours later condition unchanged. Seventy-two hours after onset, in the morning, red spots were noted on surface of back where patient had been lying. Few hours later there was a general rash over entire body which would come and go with great rapidity. Within a few minutes thereafter patient died in violent convulsions, about ninety hours after the onset of the disease.

During the writer's examination of this case, rose spots appeared on the chest in great profusion and as quickly disappeared. There was irregular breathing and a changeable circulation. Cervical muscles rather tense, but there was no retraction. Rigidity of the abdominal muscles was most marked. Kernig's sign was present, and the test for this sign was accompanied by a wide dilatation of the pupils. Patient died before serum could be obtained.

CASE II.—Service of Dr. Latimer, Sibley Hospital, March 7th and 8th. Dr. Latimer furnished the following notes: Miss B., *æt.* twenty-eight. Taken with chills, general malaise, running nose and eyes. At first thought the symptoms indicated malaria, then gripe. Patient had previously suffered from malaria. This condition lasted for ten days. Blood negative. Pain in left ear about twelfth day; discharge from same about fourteenth day. Pain on pressure over both mastoids at apex. Very nervous; and difficulty with speech. Aphasia most marked. Would hold hand over head and say, "Pain." Posterior neck muscles rigid. Breathing not irregular until mental condition became cloudy.

When Drs. Latimer, Taylor and the writer went over this case there was one phenomenon which pointed to meningeal involvement: the pulse, while regular, was unusually slow and the temperature was high. Other than this, Struempell's 'course and symptoms of typhus fever,' even to the eruption that developed a few hours later, might be used to describe this case. Dr. Kinyoun, who has had some experience with typhus fever, saw the case with us about ten hours later. By this time there was sensitiveness of the posterior cervical muscles and changeable heart speed. This condition, the increased mental apathy, and the

history of otitis media suggested the advisability of lumbar puncture. This was done, and some time after midnight Dr. Kinyoun found the meningococci in the spinal fluid. The patient received her first injection of the serum about 3 a. m., possibly two weeks after the onset of the disease. Her condition grew rapidly alarming, and, although the case looked hopeless, a second injection was given about 11:30 p. m. on the same day. Immediately after the second injection there came on muscular contractions, followed by rigidity and failure of respiration, the heart continuing to beat for several minutes after respiration had ceased.

It was while using an electric light and reflector that the prompt appearance of the eruption was noted. The reflector was applied on various parts of the body at different intervals and always brought out the eruption. Even ten minutes after death the eruption could be produced by holding the light about 10 in. from the part for half a minute. Another interesting point in this case, referred to in the first paragraph, was a complete covering of the hard and soft palate with vesicles, giving it the appearance of being thickly studded with small pearls. Herpes labialis is frequently mentioned in connection with meningitis, but a condition like this the writer has not been able to find mentioned in any of the writings.

CASE III.—Doris McG., *et. eight*, daughter of a Christian Science Healer. The writer was called to see this case April 6th, at 7 p. m. There was a history of indigestion and vomiting two days before. Possibly from her training, her symptomatology was largely negative. She answered "no" to most questions. Her head did not ache and her eyes were not sensitive, but the writer noticed that she shaded her eyes from the light. Temperature 103° F., pulse 66. Applied hot application in absence of electric light, but no eruption appeared. Suggested lumbar puncture, but parents insisted on waiting to see if a good bowel cleansing would not relieve her. Next day the writer received a telephone message that the child was better and that he need not call. On the 8th, he was summoned in haste at 10 a. m. 34 c. cm. spinal fluid were withdrawn and 15 c. cm. of Flexner's serum injected. Temperature 102° F., pulse 64. Dr. Kinyoun's examination of the spinal fluid was negative. At 7 p. m. temperature 99.6° F., pulse 84. April 9th at 10 a. m. rose spots numerous. Kernig's sign present, accompanied by marked pupillary dilatation. Temperature 100° F., pulse 80, respiration 27. At 8 p. m., temperature 99° F., pulse 72, respiration 28. April 10th condition not so good; heart weak. At 3:30 p. m., 25 c. cm. spinal fluid removed and 15 c. cm. serum injected. This, like the former treatment, was followed by marked improvement. At this time, the writer noted an herpetic eruption on the entire buccal mucous membrane and palate. Dr. Kinyoun found the meningococci in this last spinal fluid. April 11th general condition favorable. April 12th child taking nourishment and improving. April 13th and 14th there was little change. April 15th general rigidity of the muscles of the back became pronounced, but most unusual was the bulging of the left eye. April 16th right eye inflamed and more prominent than the left. April 17th the child died in coma.

The question naturally will arise, Why was not the serum continued? In the first place, because the great demand from the South at that time made it impossible to obtain the serum until after the turn in the case made its use questionable; then when the serum finally could be obtained the writer was fearful of anaphylaxis.

CASE IV.—Service of Dr. Latimer, who supplied the following notes: Mrs. B., *et. thirty-eight*, taken with violent pain in temple. Patient beside herself with pain. Was unconscious for twelve hours. Improved for one week. Pain returned. Patient soon became unconscious again. Pulse slow and breathing irregular.

The writer saw this case April 13th and 16th. On the first visit the condition was thought to be due to uremia, and a previous albuminuria rather substantiated this. On the second visit a lumbar puncture drew off a turbid pink fluid and Flexner's serum was injected. Dr. Kinyoun confirmed the last diagnosis. The patient died in twenty-four hours.

CASE V.—Seen at Kenilworth with Dr. Z. M. Brady. The following notes were supplied by Dr. Brady: Howard E. L., *et.* one year and seventeen months. On April 22nd Dr. Brady was first called. Patient had then been ill two days. There was fever, vomiting and constipation, which continued until April 27th, when food was refused. April 28th stupor began and continued.

On May 1st the writer saw the case with Dr. Brady. Temperature 105° F., pupils irregular, post-cervical muscles rigid, back stiffened, Kernig's sign present accompanied by pupillary dilatation, and there was a petechial eruption. MacEwen's percussion note over the frontoparietal juncture indicated the presence of increased fluid in the head. Later there was a variation in circulation. Lumbar puncture showed high pressure. 36 c. cm. spinal fluid were withdrawn and 30 c. cm. of Flexner's serum injected. On May 5th child died in coma. Bacteriological report later confirmed diagnosis.

CASE VI.—Service of Dr. D. Olin Leech. Dr. Leech gives the following notes from his records: N., *et.* six and a half. Adenoids and tonsils removed by Dr. Charles Richardson, June 25th, 1912. Kept in bed 26th and 27th. June 28th had severe convulsions. During the night spasm of the right side lasted about four hours. Pupils irregular: right contracted, left dilated; could not see for about three days. Gave chloroform several times on the 28th to control convulsions, also sodium bromide and gelsemium.

The writer saw this case at 10 a. m., June 29th. While there was a question as to the variety, there was no question about meningitis being present. It was decided to take advantage of an early injection in the event that it might prove to be a meningococcus infection. After 36 c. cm. spinal fluid had been withdrawn, 30 c. cm. of Flexner's serum was injected. Dr. Kinyoun's examination of the spinal fluid showed only a few sound cells, and he suggested the possibility of tuberculosis. Patient had no more convulsions and made a slow but uninterrupted convalescence. Urinary analysis made July 10th showed both red and white blood-cells and a few cotton-like fibres. Boy is now well and attending school.

CASE VII.—Seen with Dr. Albert P. Tibbets. The following notes supplied by Dr. Tibbets: Mrs. D. G., *et.* nineteen, white, student. For the last week has complained of slight headache and diarrhea; seven or eight 'pea soup' stools in twenty-four hours. Patient took to her bed September 7th and was first seen September 8th at 6 p. m. Position, dorsal decubitus, face white, cheeks flushed, and eyes bright. Tongue was clean, slight tenderness over stomach and intestines, and slight rigidity of the recti muscles. There was marked bronchitis, also a slight occipital headache. Patient was drowsy and disinclined to talk, but answered questions in a rational manner. Temperature was 102.4° F., pulse 120. During the next six days there was a slight change for the better; the temperature came down to 100° F., the headache ceased and the bronchitis and diarrhea became much improved. Mental condition was unchanged. She answered direct questions, but laughed most of the time. On the third night after she took to her bed she was found wandering around the house. Tests for malaria, typhoid, and tuberculosis returned negative. On the sixth day several rose spots appeared on the abdomen and back. These did not disappear on pressure and lasted but one day. Patient was admitted to the hospital on September 13th, the sixth day after she had taken to her bed.

On September 15th, the eighth day after the writer's first visit, the tempera-

ture was 100.8° F., pulse 112, respiration 20, and there was a slight rigidity of the muscles of the back of the neck. Photophobia was present, and Kernig's sign and the *tache cérébrale* were obtained. A slight erythema was noted over the abdomen. Patient refused to answer questions or take nourishment, and laughed continually. By evening the symptoms had increased, and Dr. Barnes was called in consultation. By means of his heat and light test he brought out petechiæ over the abdomen, back, and outer side of the thigh. This decided the diagnosis, and serum was injected the same evening at 8 p. m. 40 c. cm. of the spinal fluid was removed and 30 c. cm. of the antimeningococcic serum injected. Following this injection the temperature went down to 99.4° F. in axilla and then rose to 102.4° F. The spinal fluid was clear, and an examination made the next morning by Dr. Kinyoun failed to reveal the diplococcus intracellularis. On September 16th, at 8 p. m., spinal fluid was withdrawn, and 30 c. cm. of serum injected. Spinal fluid showed cloudy, but an examination made for the diplococcus intracellularis meningitidis the next morning was negative. After injection the temperature was 101° F. in axilla, pulse 120.

September 17th the third injection was given. Spinal fluid cloudy, but negative. Temperature just after injection 100.8° F. in axilla; at 2 a. m. 102.8° F. in axilla. On September 18th, tenth day of the disease, at 8 p. m., fourth injection of serum was made; spinal fluid was examined at once by Dr. Barnes and the diplococcus intracellularis meningitidis found. Immediately after injection the axillary temperature was 99.8° F.; at 9 p. m. it was 99° F. It then rose steadily until at midnight it reached 104.6° F. in axilla; and at 3 a. m. 105° F. in axilla. Patient complained of a sudden severe abdominal pain, tossed about in bed and beat the wall with her hands. The abdomen was rigid and swollen. The pain was relieved by hot applications. Pulse was 155 and scarcely perceptible. It responded to active stimulation, however, and the temperature began to drop. By noon of the next day it had reached 97.2° F. in axilla, and from that day on has run an irregular course ranging, in the axilla, from 96.4 to 100.8° F.

(Subsequent Note.) This case ran on for several months, during which time there were numerous disturbances, particularly of the central mechanism. At one time there was a pronounced albuminuria and suppression of the urine that threatened to terminate fatally. Her mental condition improved very slowly and at times the disorientation was marked. On November 24th the withdrawal of 60 c. cm. of cerebrospinal fluid improved the mental condition markedly. The spinal fluid at this time was normal. On December 18th, and again on January 1st, lumbar puncture and the withdrawal of spinal fluid was repeated to relieve pressure symptoms. The patient was entirely recovered by February 1st and has since remained well.

CONCLUSIONS.

The result of these observations is to bring out the atypical character of the cases of cerebrospinal meningitis which have occurred in and around the District of Columbia during the past two years. The following facts are worthy of mention:—

1. That cervical opisthotonos was one of the very last signs to develop.
2. The contraction of the recti and other abdominal muscles, noticeable in all the cases.
3. In several of the cases the symptoms for a week or more could have been mistaken for any other disease on account of the absence of the classical symptoms of meningitis.

4. The disproportion between the pulse-rate and temperature, particularly noticeable in 3 of the cases.

5. The dilatation of the pupils produced in all cases when Kernig's sign was being elicited, also in several instances when the head was being flexed upon the chest.

6. The complete covering of the palate with herpes vesicles in 2 of the cases.

7. The ability to produce the rash in true cerebrospinal meningitis with the electric light and reflector, which phenomenon could not be induced in meningitis due to other organisms.

8. The necessity for prompt examination, and re-examination of the spinal fluid.

9. The importance of making a leucocyte count.

THE ACUTE DIARRHEAS OF INFANTS.

By RICHARD M. SMITH, M. D., of Boston, Mass.

There has been much discussion in recent years concerning the acute diarrheas of infants. This discussion has more than an academic interest. The failures in the treatment of these patients in the past have been due in part at least to an erroneous conception of the diseases. In discussions of gastro-intestinal disturbances emphasis formerly was placed upon the presence of diarrhea, vomiting, convulsions or other symptoms, and therapy was based upon this interpretation. At the present time these symptoms are considered merely as such which depend for their existence upon common causes. In an individual patient one or the other of the symptoms may predominate according to the circumstances. Effort is directed toward finding the cause of the disturbance, not primarily in stopping the vomiting or checking the diarrhea. It is possible to differentiate certain fairly distinct groups among these acute diarrheas. The recognition of these groups is important because the treatment of each group differs from that of the others.

The first important group is associated with disturbances of digestion. These cases occur at any time of the year and in all classes of the community. Overfeeding is usually responsible for the condition. The overfeeding may be due to bad food, such as unripe fruit, dirty milk, or some other obviously improper article of diet, or it may be due to an excess of a food which in moderation would cause no trouble. This is the simplest of all the acute gastro-intestinal disturbances. The onset is usually abrupt, accompanied by vomiting and diarrhea without temperature or toxic symptoms. The treatment consists in free catharsis, a short period of starvation and a rapid return to normal diet. In all the acute gastro-intestinal disturbances, castor-oil is the cathartic of choice. In infants with severe vomiting when castor-oil cannot be retained, calomel in divided doses may be used.

Overfeeding may be due to an excess of a single food element. Overfeeding in fat usually produces an abrupt disturbance frequently accompanied by convulsions. Fever is a common occurrence but is of short duration. There is loss of appetite and usually vomiting. In many instances a rash appears which may be mistaken for one of the exanthemata. The stools are frequent in number, green in color and contain mucus and many fine, soft curds. The diarrhea is kept up presumably by the presence of the irritating fatty acids in the intestine. The treatment of this condition consists in the reduction in or elimination from

the diet of the element which is causing the trouble—namely, the fat. The return to a larger amount of fat must be slow and always guided by an examination of the stools. No more fat should be given than the infant can digest.

Overfeeding in carbohydrates may be brought about by overfeeding in sugar or in starch. The onset is as a rule not quite so stormy as in fat disturbance, and fever if present at all is of very short duration. Usually there is a good deal of gas which is belched from the stomach and passed by rectum. Vomiting is not a prominent symptom. A rash may be present in this condition also. In some instances it can be distinguished from the eruption due to overfeeding in fat. In general, it may be said that the carbohydrate rash is more diffuse and shows less tendency to localization on the face and to become moist. Usually it itches very badly. The stools are frequent and vary in color from yellow to brown and green. They may be watery or may contain fecal matter and mucus. Sometimes they are frothy. Usually there is excoriation of the buttocks. This is the most distinguishing characteristic of this type of overfeeding. The treatment of this condition consists in the elimination of or a change in the character of the carbohydrate in the food. In the convalescence, malt sugar is usually better borne than lactose.

So far as we are aware proteid overfeeding does not cause any acute gastro-intestinal disturbance except that overfeeding in whey may result in frequent stools. What element in the whey is responsible for this we are not at the present time able to state. The relation of the salts in the diet to disturbances of digestion is not well known. Whatever knowledge we have on this matter is not so correlated as to be of practical application at the present time.

The second group of acute diarrheas is well recognized but much more difficult to designate. It is the type of disturbance popularly known as 'summer complaint.' The cases come in waves. Certain facts would seem to indicate that the cause of disturbance in this group is in some way related to atmospheric conditions. Improvement in the milk supply and protection of infants from infection leaves this group of disturbances undiminished in frequency. In sections of the country where there is very low humidity this type of disease is practically unknown. In communities where it exists it is most common in those sections where there is greatest congestion and the poorest housing conditions. Possibly bacteria enter into the etiology of these cases, but presumably only as a secondary factor. The onset in this type of disturbance is abrupt, usually closely associated with changes in weather. Fever is present, often high but lasting only a day or two. Convulsions may occur. There is usually marked prostration with depressed eyes, dry skin and semi-coma. Vomiting is often a prominent symptom. The stools are frequent in number, green in color and contain mucus, but present no other char-

acteristic appearance. Blood and pus are usually absent except that if diarrhea continues for a considerable period of time the irritation may result in bloody stools.

The treatment of this type of diarrhea consists in the restoration of the normal temperature relations of the body. Evaporation from the skin should be brought about by sponging with cold water or alcohol. The removal of the infant to a place where there is cool air or at least a breeze is immediately followed by a favorable reaction. Liquids must be supplied in large quantities by mouth if possible, if not under the skin. At the outset castor-oil and a single colon irrigation should be given. After twelve or twenty-four hours it is usually possible to begin giving cereal water and in a very short time diluted milk. The return to a full diet must be regulated by the progress of the individual patient, but in most instances is fairly rapid. It is this kind of illness which is so strikingly benefited by treatment on a Floating Hospital or at a hospital in the country.

We come now to the consideration of the third group of acute diarrheas in which bacteria play a primary rôle. The term infectious diarrhea is not a very satisfactory name for the condition, but is used to designate a group of diseases caused by infectious organisms, *i. e.*, by bacteria, in which the chief symptom is diarrhea. These diseases are quite different from the other groups. We are dealing now with infectious diseases and our point of view and method of treatment must be modified accordingly.

The first thing to consider in these diseases is prophylaxis. How can we prevent an individual infant from becoming infected, and how can we prevent an infant who has the disease from giving it to others? In general, the bacteria causing these diseases enter the body through the mouth with the food. Since milk is the principal article of food for infants, a supervision of the milk supply becomes of immediate importance. Water may contain the infective agent, as may also any article of food eaten in an uncooked state. In the care of a baby ill with infectious diarrhea it is necessary to use the same care as in other infectious diseases. Flies and insects may easily spread the infection. Great care should be exercised carefully to screen the patients and their excreta.

The bacteria causing infectious diarrhea are the dysentery bacillus, the gas bacillus and other organisms not yet fully determined. Clinically, infectious diarrhea is an entity and its various subdivisions can be distinguished with certainty only by a bacteriological examination of the stools.

Bacillary dysentery is an infectious disease due to the dysentery bacillus. The bacillus may be of two types, the Shiga or the Flexner, differing only in cultural characteristics. The symptoms are digestive and toxic. Diarrhea usually is the first sign of the disease. There may be as many as twenty or thirty movements in twenty-four hours. The stools are

very loose and contain large amounts of water, are usually green in color with fine white curds, considerable mucus, pus and blood. They may have a characteristic sweetish odor. They are accompanied by tenesmus. Vomiting is the rule. Fever is usually high, often 104° or 105° F., and continues for a considerable length of time. Toxemia and prostration are marked, the pulse is weak, the color poor, respiration often sighing. The loss of water is shown by a depressed fontanelle, sunken eyes, scaphoid abdomen and a dry skin.

On post-mortem examination the principal lesion is found to be in the intestinal tract, especially in the large intestine where there are numerous small and large ulcers. Elsewhere in the body are the signs of a general infection. The extent of the local lesion bears no direct relation to the severity of the infection.

The prognosis is grave. The infants die within a few days of the first symptoms or occasionally the disease becomes chronic in character but ends fatally.

Treatment consists of two things: First, treatment of the toxemia, which is by far the more important, and secondly, the treatment of the local condition. In the first place, a cathartic should be given to clean the intestinal tract so far as possible. For this, castor-oil is best, then water should be given freely and all other food withheld. The amount of water should be equal at least to the amount of liquids which the child would be taking were he taking a normal amount of food for a child of his age and size. If the child is unable to take water by mouth it should be supplied in some other way. Usually tenesmus and frequent movements prevent the giving of liquids by rectum, so that subcutaneous injections are necessary. For this normal salt solution is used. Following this initial purgation and starvation, after twelve to fourteen hours, a 5 per cent. lactose solution should be given. This serves two purposes, in the first place it supplies a certain amount of nourishment and in the second place it prevents the formation of toxic products. In the presence of a utilizable carbohydrate the dysentery bacillus will break down only enough proteid to supply its nitrogen requirement. It is the proteid products which are toxic. The lactose feeding prevents the formation of those substances in the body by the bacteria. Living matter needs proteid, and this must be supplied in the food to prevent too great a drawing upon the proteid of the body. Just when anything other than lactose should be given must be decided in accordance with the condition of the individual patient. Milk should be withheld for a considerable length of time. It is rarely wise to increase the diet so long as the temperature is elevated or the stools contain blood. Dextrose infusions 2.5 per cent. may be given as another means of supplying food and liquid. Stimulation is often necessary. In the treatment of the local condition of the intestine cleanliness is most important. Irrigations of the colon with normal salt solution or plain sterile water should be given twice daily

provided they are not followed by a severe depressing reaction. If there is a tendency to collapse they should not be given at all. A certain number of cases seem to be benefited by an astringent injection. For this purpose one pint of a 3 per cent. silver nitrate solution injected after a cleaning irrigation with sterile water has proved most valuable.

In gas bacillus dysentery the symptoms and stool picture are like bacillary dysentery. The bacterial examination of the stools, however, shows the gas bacillus in large numbers.* Pathologically the lesions are very different from bacillary dysentery. No ulcers are found, but there is a general pinpoint exudate over the mucous membrane of the large intestine. In the severe lesions a pseudo-membrane is formed. The prognosis in this disease is good provided the proper treatment is started early. The treatment consists in the administration of a food of high proteid and low carbohydrate composition. The gas bacillus develops easily on a carbohydrate food and its growth is not self-limiting. After the initial purgation buttermilk should be administered, by stomach tube if necessary. The composition of this food fulfils the requirements, and the presence of the lactic acid bacilli is unfavorable to the growth of the gas bacilli.

There are many cases of infectious diarrhea in which the dysentery bacillus or the gas bacillus is not present in large numbers. These cases are undoubtedly caused by organisms which as yet cannot be exactly classified. Future study will reduce the undetermined cases to a minimum. The treatment of these cases must be along the lines outlined for bacillary and gas infections—feeding either carbohydrate or proteid as response in the individual patient may indicate.

It is possible that the streptococcus is responsible for a distinct disease in this group, *i. e.*, that it is a primary etiological factor. It is probable, however, that its connection here is the same as in scarlet fever where it evidently is a complicating organism. The presence of streptococci in the stools in any considerable numbers adds to the gravity of the prognosis but does not modify the treatment.

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*For a simple and rapid method of determining the presence of gas bacilli in the stools, see Kendall and Smith (*Boston Med. and Surg. Journ.*, Vol. CLXIII, p. 578, 1910).

THE INFLUENCE OF THE INJECTION OF TUBERCULIN ON THE EOSINOPHIL CELLS IN THE PERIPHERAL BLOOD.

(From the Polyclinic Laboratories, Philadelphia.)

By JOHN M. SWAN, M. D., of Rochester, N. Y.

In 1904, the writer published the results of a study of the blood of 25 cases of pulmonary tuberculosis.¹ In the course of this study, he noticed that in the fatal cases the eosinophil cells, as a rule, disappeared from the peripheral blood. In that paper he made the following statement: "I am inclined to believe that the presence or absence of eosinophils in the peripheral blood of tuberculous patients is a sign of some prognostic significance. . . . The variation of the eosinophil cells in the circulating blood of tuberculous patients may be explained as follows: In cases of incipient tuberculosis, eosinophil cells are present in the blood-stream in about normal proportion, because there is not enough tuberculin manufactured in the lesions to produce a marked eosinophilia. When, however, the secondary infection with the organisms of suppuration occurs, the neutrophil cells are attracted by the chemotactic power of the products of their growth which circulate in the blood, and the eosinophil cells are repelled, so that we find an excess of polymorphonuclear neutrophil cells in the peripheral blood. As the patient gradually becomes more saturated with the latter poisons and the fatal termination approaches, the eosinophils progressively diminish in number and disappear from the peripheral blood. If, however, the progress of the case is influenced favorably by treatment, the symptoms of the secondary infection disappear and the chemotactic influence of the products of pyogenic organisms is withdrawn, so that the tuberculin being produced in the lesions may exercise its chemotactic influence to attract the eosinophilous polymorphonuclear cells from the bone-marrow into the blood-stream."

In 1907, in collaboration with Karsner,² the writer reported the results of a further study of 31 cases in which differential leucocyte counts were made in order to throw some light upon the prognostic significance of the eosinophil cells. As a result of this study, we concluded that the eosinophil cells tend to disappear from the circulating blood as the progress of the disease brings the fatal termination nearer. We also concluded that if the patient improves under treatment, or if the disease shows a tendency to become arrested, the eosinophil cells reappear in the circulating blood.

If the hypothesis advanced in the writer's first paper is correct, the

injection of tuberculin for diagnostic purposes ought to be followed by an eosinophilia. This result has been observed by Levaditi,³ Zappert,⁴ Bischoff,⁵ and Botkin.⁶ Smith, Mullen, and Rivas⁷ have produced eosinophilia in the leucocytes of citrated dog's blood by the addition of tuberculin and other toxic materials.

Ullom and Craig⁸ and Wright and King⁹ have not been able to see any prognostic significance in the eosinophil cells in tuberculosis. The former authors say: "At the beginning of the investigation the eosinophils seemed to increase with the patient's improvement; but further study did not support this view." The latter authors say that the eosinophil cells remain normal. Solis-Cohen and Strickler¹² found the percentage of eosinophil cells unaffected by the stage or by the extent of the disease or by the condition of the patient. On the other hand, Miller and Reed¹⁰ have found that with the progress of the disease the eosinophils become less numerous until they almost entirely disappear from the blood in the terminal stages. Rayevsky¹¹ found the eosinophil cells always decreased. The variation of the percentage of eosinophils corresponded in his experience to the anatomical and histopathological changes in the lungs. The more extensive the process, the lower the eosinophil percentage. In the far advanced cases, with some exceptions, he failed to find them in the circulating blood.

At the time of the publication of his first paper, in 1904, the writer determined to investigate the influence of tuberculin on the eosinophil cells when injected for diagnostic purposes.

CASE I.—The first case in which the writer had the opportunity to study this matter was that of a boy, *æt.* ten, a patient of Dr. Charles H. Frazier, in the University Hospital, Philadelphia. The child had double hip-joint disease of four or five years' duration. The left leg was ankylosed in abduction and flexion, with contraction of the knee. The right leg was ankylosed in adduction with slight contraction of the knee; there were suppurating sinuses on both sides. The temperature ranged from 98° F. in the morning to 100° F. in the afternoon. Blood-smears were made from this patient twice a day by Dr. B. A. Thomas, who was then Dr. Frazier's resident. The first smears were made the day before the first injection of 1 mgrm. of tuberculin was given. The second injection of 3 mgrm. of tuberculin was given two days later, and the third injection of 5 mgrm. of tuberculin was made two days after that. After the injection of 5 mgrm. of tuberculin, the eosinophil cells rose to 7.8 per cent. on the first examination, 6.2 per cent. on the second examination, and 6.4 per cent. on the third examination. The injection of tuberculin was accompanied by an increase of temperature to 102.8° F., the highest noted. At the beginning of the examination of this patient the eosinophils formed 2.2 per cent. and 3.2 per cent. of the leucocytes in the peripheral blood.

January 18th, 1905: Temperature, 98.2° F.; first specimen of blood prepared at 10:45 a. m. showed polymorphonuclear neutrophils, 76.0 per cent.; lymphocytes, 17.8 per cent.; transitionals, 4.0 per cent.; eosinophils, 2.2 per cent.; total, 100.0 per cent. The red cells showed slight anisocytosis and deficient hemoglobin.

The second specimen of blood was prepared at 8:00 p. m. Temperature, 100.2° F. Polymorphonuclear neutrophils, 55.2 per cent.; lymphocytes, 34.4 per

cent.; transitionals, 6.8 per cent.; eosinophils, 3.2 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent.

January 20th, 1905, 1 mgrm. of tuberculin injected at 9:00 a. m. The third specimen of blood was prepared at 10:30 a. m. Temperature, 100° F. Polymorphonuclear neutrophils, 68.0 per cent.; lymphocytes, 27.6 per cent.; transitionals, 2.8 per cent.; eosinophils, 1.4 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

The fourth specimen was prepared at 5:45 p. m. Temperature, 101.6° F., the highest since the injection of tuberculin. Polymorphonuclear neutrophils, 56.4 per cent.; lymphocytes, 34.8 per cent.; transitionals, 5.2 per cent.; eosinophils, 2.4 per cent.; basophils, 1.2 per cent.; total, 100.0 per cent.

January 21st, 1905, the fifth specimen of blood was prepared at 11:00 a. m.; temperature, 99.8° F. Polymorphonuclear neutrophils, 72.0 per cent.; lymphocytes, 15.0 per cent.; transitionals, 8.0 per cent.; eosinophils, 3.8 per cent.; basophils, 1.0 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

January 22nd, 1905, 3 mgrm. tuberculin were injected at 9:00 a. m.; temperature, 10:00 a. m., 102.2° F. The sixth specimen of blood was made at 11:45 a. m.; temperature, 101.6° F. Polymorphonuclear neutrophils, 75.0 per cent.; lymphocytes, 15.4 per cent.; transitionals, 7.2 per cent.; eosinophils, 2.2 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

January 23rd, 1905. The temperature reached 102.8° F. at midnight yesterday, the highest after the injection of 3 mgrm. of tuberculin. The seventh specimen of blood was prepared at 10:15 a. m. Temperature, 99.2° F. Polymorphonuclear neutrophils, 67.0 per cent.; lymphocytes, 18.2 per cent.; transitionals, 12.0 per cent.; eosinophils, 1.8 per cent.; basophils, 0.6 per cent.; myelocytes, 0.4 per cent.; total, 100.0 per cent. The specimen contained many degenerated forms of leucocytes.

January 24th, 1905, 5 mgrm. of tuberculin injected at 9:00 a. m. The eighth specimen of blood was prepared at 10:15 a. m.; temperature, 99.4° F. Polymorphonuclear neutrophils, 62.6 per cent.; lymphocytes, 22.2 per cent.; transitionals, 6.8 per cent.; eosinophils, 7.8 per cent.; basophils, 0.4 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

The ninth specimen of blood was prepared at 6 p. m.; temperature, 102° F.; pulse, 124; respiration, 28. Polymorphonuclear neutrophils, 56.0 per cent.; lymphocytes, 32.4 per cent.; transitionals, 5.0 per cent.; eosinophils, 6.2 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent. Nine degenerated eosinophil cells were seen in counting 500 leucocytes.

January 25th, 1905. Yesterday at 6:00 p. m. and at 9:00 p. m. the temperature was 102° F., the highest reached after the injection of 5 mgrm. of tuberculin. The tenth specimen of blood was prepared at 10:45 a. m.; temperature, 99° F. Polymorphonuclear neutrophils, 72.8 per cent.; lymphocytes, 14.8 per cent.; transitionals, 5.6 per cent.; eosinophils, 6.4 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent. In this count only 250 leucocytes were counted.

CASE II.—The second case in which the writer had the opportunity to notice the influence of the injection of tuberculin on the eosinophil cells was that of a male, *æt.* sixty-five, who was supposed to have Addison's disease. He was being treated in the service of Dr. Alfred Stengel, for whom the writer was then substituting, in the Philadelphia General Hospital. The patient died shortly after the last dose of tuberculin was given, but before death tubercle bacilli were found in his sputum. No autopsy was obtained. In this case the eosinophil cells disappeared from the blood after the first injection of 3 mgrm. was given and did not reappear.

July 21st, 1905. The first specimen of blood was prepared at noon; temperature, 97.8° F.; pulse, 105. Polymorphonuclear neutrophils, 75.0 per cent.; lymphocytes, 14.4 per cent.; large mononuclears, 7.2 per cent.; eosinophils, 0.4 per cent.; basophils, 1.2 per cent.; myelocytes, 1.8 per cent.; total, 100.0 per cent.

The second specimen of blood was prepared at 4:00 p. m.; temperature, 97.8° F.; pulse, 105. Polymorphonuclear neutrophils, 85.0 per cent.; lymphocytes, 9.2 per cent.; large mononuclears, 4.0 per cent.; transitionals, 0.2 per cent.; eosinophils, 0.2 per cent.; basophils, 0.4 per cent.; myelocytes, 1.0 per cent.; total, 100.0 per cent.

July 22nd, 1905, 3 mgrm. of tuberculin were injected at 10:00 a. m. The third specimen of blood was prepared at 11:00 a. m.; temperature, 98.4° F.; pulse, 104. Polymorphonuclear neutrophils, 83.4 per cent.; lymphocytes, 11.2 per cent.; large mononuclears, 4.6 per cent.; basophils, 0.8 per cent.; total, 100.0 per cent.

The fourth specimen of blood was prepared at 5:00 p. m.; temperature, 98.4° F.; pulse, 100. Polymorphonuclear neutrophils, 78.6 per cent.; lymphocytes, 12.6 per cent.; large mononuclears, 8.2 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

July 23rd, 1905. The fifth specimen of blood was prepared at 11:00 a. m.; temperature, 96.8° F.; pulse, 105. Polymorphonuclear neutrophils, 80.2 per cent.; lymphocytes, 13.0 per cent.; large mononuclears, 6.4 per cent.; transitionals, 0.4 per cent.; total, 100.0 per cent.

The sixth specimen of blood was prepared at 5:00 p. m.; temperature, 99° F.; pulse, 110. Polymorphonuclear neutrophils, 84.4 per cent.; lymphocytes, 9.8 per cent.; large mononuclears, 3.6 per cent.; transitionals, 0.6 per cent.; myelocytes, 1.6 per cent.; total, 100.0 per cent.

July 24th, 1905, 6 mgrm. of tuberculin were injected at 10:00 a. m. The seventh specimen of blood was prepared at 10:45 a. m.; temperature, 98.4° F.; pulse, 120; the patient was perspiring freely. Polymorphonuclear neutrophils, 88.4 per cent.; lymphocytes, 8.2 per cent.; large mononuclears, 3.2 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

The eighth specimen of blood was prepared at 5:20 p. m.; temperature 97° F.; pulse, 100. Polymorphonuclear neutrophils, 76.6 per cent.; lymphocytes, 9.2 per cent.; large mononuclears, 14.0 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

July 25th, 1905, the ninth specimen of blood was prepared at 12:30 p. m.; temperature, 96° F.; pulse, 122. The sputum contained tubercle bacilli. Polymorphonuclear neutrophils, 88.6 per cent.; lymphocytes, 5.6 per cent.; large mononuclears, 5.2 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

The tenth specimen of blood was prepared at 6:00 p. m. Polymorphonuclear neutrophils, 84.0 per cent.; lymphocytes, 7.6 per cent.; large mononuclears, 8.4 per cent.; total, 100.0 per cent.

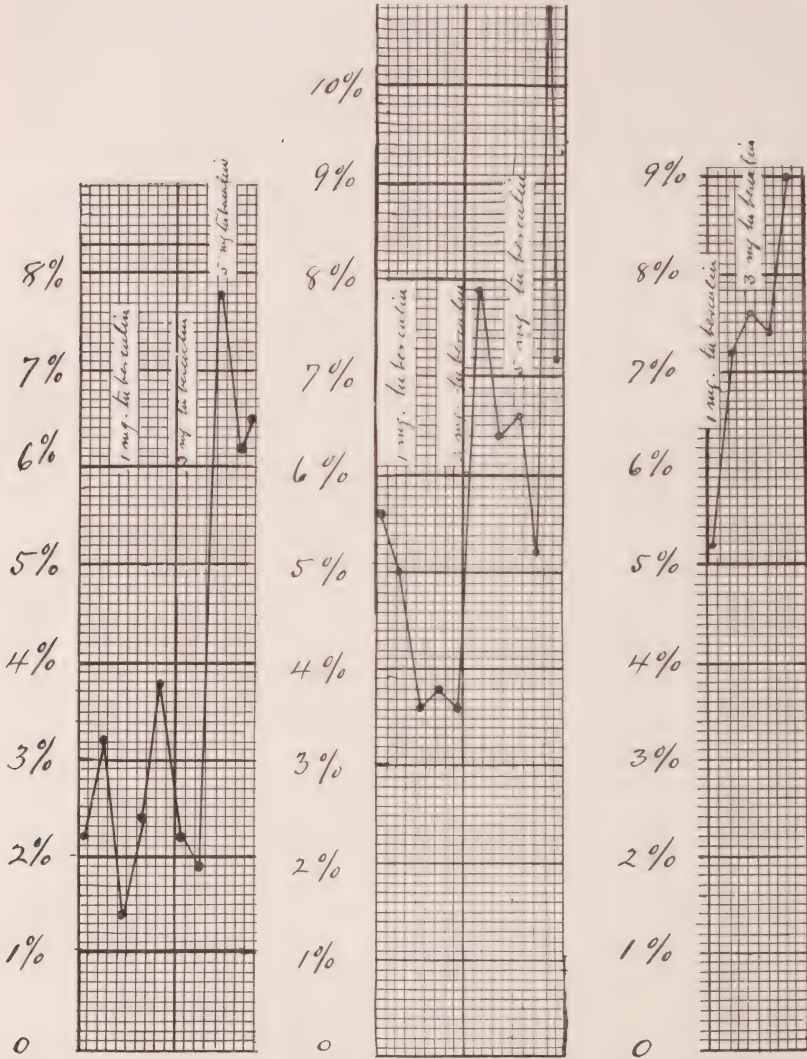
CASE III.—The third case occurred in a female, *æt.* seven, who had hip-joint disease. She was a patient of Dr. James K. Young, in the Polyclinic Hospital, Philadelphia.

This case was interesting because at the time of the first observation the patient had an eosinophilia due to the presence of *ascaris lumbricoides* in the intestines. After the passage of the round worms the eosinophilia disappeared, and after the administration of the last dose of the tuberculin there was a marked increase in the number of eosinophil cells.

January 2nd, 1907. The first specimen of blood was prepared at 3:30 p. m.; temperature, 98.2° F.; pulse, 92; respiration, 26. Polymorphonuclear neutrophils, 51.0 per cent.; lymphocytes, 29.4 per cent.; transitionals, 8.8 per cent.; eosinophils, 5.6 per cent.; basophils, 0.2 per cent.; myelocytes, 5.0 per cent.; total, 100.0 per cent.

January 3rd, 1907. The second specimen of blood was prepared at 1:30 p. m., and immediately afterwards 1 mgrm. tuberculin was injected; temperature, 99.6° F.; pulse, 96; respiration, 26. Polymorphonuclear neutrophils, 55.6 per cent.; lymphocytes, 29.4 per cent.; transitionals, 6.0 per cent.; eosinophils, 5.0 per cent.; myelocytes, 4.0 per cent.; total, 100.0 per cent.

January 4th, 1907. The third specimen of blood was prepared at 9:00 a. m.; temperature, 98° F.; pulse, 92; respiration, 24. The patient passed one ascaris lumbricoides worm at 3:20 a. m. Polymorphonuclear neutrophils, 50.2 per cent.; lymphocytes, 20.8 per cent.; transitionals, 21.0 per cent.; eosinophils, 3.6 per cent.; basophils, 1.0 per cent.; myelocytes, 3.4 per cent.; total, 100.0 per cent.



Case I.—Male, *æt.* ten. Case III.—Female, *æt.* seven.

Case IV.—Male, *æt.* twenty-five.

The fourth specimen of blood was prepared at 4:30 p. m.; temperature, 101.4° F.; pulse, 130; respiration, 28. Polymorphonuclear neutrophils, 59.8 per cent.; lymphocytes, 24.6 per cent.; transitionals, 8.6 per cent.; eosinophils, 3.8 per cent.; basophils, 0.8 per cent.; myelocytes, 2.4 per cent.; total, 100.0 per cent.

January 5th, 1907. The fifth specimen of blood was prepared at 10:00 a. m.;

temperature, 98° F.; pulse, 96; respiration, 24. The patient passed one ascaris lumbricoides worm at noon. 3 mgrm. tuberculin were injected at 2:00 p. m. Polymorphonuclear neutrophils, 29.2 per cent.; lymphocytes, 9.2 per cent.; large mononuclears, 55.2 per cent.; eosinophils, 3.6 per cent.; basophils, 1.6 per cent.; myelocytes, 1.2 per cent.; total, 100.0 per cent.

January 6th, 1907. The sixth specimen of blood was prepared at noon; temperature, 98.6° F.; pulse, 112; respiration, 24. Polymorphonuclear neutrophils, 48.4 per cent.; lymphocytes, 28.6 per cent.; large mononuclears, 13.6 per cent.; transitionals, 0.8 per cent.; eosinophils, 7.8 per cent.; basophils, 0.8 per cent.; total, 100.0 per cent.

The seventh specimen of blood was prepared at 6:00 p. m.; temperature, 100.4° F.; pulse, 100; respiration, 32. The patient passed one ascaris lumbricoides worm at 4:00 p. m. Polymorphonuclear neutrophils, 40.0 per cent.; lymphocytes, 32.0 per cent.; large mononuclears, 20.6 per cent.; transitionals, 0.6 per cent.; eosinophils, 6.4 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent.

January 7th, 1907. The eighth specimen of blood was prepared at 1:00 p. m.; temperature, 98.8° F.; pulse, 100; respiration, 28. 5 mgrm. of tuberculin were injected at 1:15 p. m. Polymorphonuclear neutrophils, 43.8 per cent.; lymphocytes, 31.0 per cent.; large mononuclears, 15.8 per cent.; transitionals, 2.2 per cent.; eosinophils, 6.6 per cent.; basophils, 0.4 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

January 8th, 1907. The ninth specimen of blood was prepared at 11:00 a. m.; temperature, 98.2° F.; pulse, 104; respiration, 28. Polymorphonuclear neutrophils, 32.2 per cent.; lymphocytes, 41.4 per cent.; large mononuclears, 17.0 per cent.; transitionals, 2.8 per cent.; eosinophils, 5.2 per cent.; basophils, 1.0 per cent.; myelocytes, 0.4 per cent.; total, 100.0 per cent.

The tenth specimen of blood was prepared at 10:00 p. m.; temperature, 100° F.; pulse, 120; respiration, 26. Polymorphonuclear neutrophils, 35.2 per cent.; lymphocytes, 41.6 per cent.; large mononuclears, 6.4 per cent.; transitionals, 3.8 per cent.; eosinophils, 10.8 per cent.; basophils, 1.6 per cent.; myelocytes, 0.6 per cent.; total, 100.0 per cent.

January 9th, 1907. The eleventh specimen of blood was prepared at 1:30 p. m.; temperature, 98.2° F.; pulse, 100; respiration, 24. Polymorphonuclear neutrophils, 47.2 per cent.; lymphocytes, 31.8 per cent.; large mononuclears, 8.4 per cent.; transitionals, 4.4 per cent.; eosinophils, 7.2 per cent.; basophils, 1.0 per cent.; total, 100.0 per cent.

CASE IV.—The fourth case occurred in a white, adult male, a patient of Dr. W. Campbell Posey, in the Wills Hospital, Philadelphia. The patient was suffering from tuberculous iritis. The eosinophils increased from 5.2 per cent. to 9.0 per cent. after the injection of 3 mgrm. tuberculin. After the injection of 5 mgrm. tuberculin, one specimen of blood was lost on account of poor technique and the second specimen showed no eosinophil cells.

December 26th, 1907. The first specimen of blood was prepared at 5:00 p. m., and 1 mgrm. tuberculin was injected immediately after. Polymorphonuclear neutrophils, 65.8 per cent.; lymphocytes, 11.8 per cent.; large mononuclears, 9.0 per cent.; transitionals, 7.6 per cent.; eosinophils, 5.2 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

December 27th, 1907. The second specimen of blood was prepared at 11:00 a. m.; temperature, 98° F. Polymorphonuclear neutrophils, 68.4 per cent.; lymphocytes, 8.0 per cent.; large mononuclears, 14.0 per cent.; transitionals, 1.8 per cent.; eosinophils, 7.2 per cent.; basophils, 0.4 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

December 28th, 1907. The third specimen of blood was prepared at 11:00 a. m.; temperature, 100.6° F. 3 mgrm. tuberculin were injected at noon. Poly-

morphonuclear neutrophils, 61.6 per cent.; lymphocytes, 14.0 per cent.; large mononuclears, 11.0 per cent.; transitionals, 4.4 per cent.; eosinophils, 7.6 per cent.; basophils, 1.4 per cent.; total, 100.0 per cent. In counting 500 leucocytes, one normoblast was seen.

December 29th, 1907. The fourth specimen of blood was prepared at 5:00 p. m.; temperature, 99° F. Polymorphonuclear neutrophils, 61.8 per cent.; lymphocytes, 14.8 per cent.; large mononuclears, 14.2 per cent.; transitionals, 1.8 per cent.; eosinophils, 7.4 per cent.; total, 100.0 per cent.

December 30th, 1907. The fifth specimen of blood was prepared at 11:00 a. m.; temperature, 98° F. Polymorphonuclear neutrophils, 50.8 per cent.; lymphocytes, 16.2 per cent.; large mononuclears, 17.4 per cent.; transitionals, 5.6 per cent.; eosinophils, 9.0 per cent.; basophils, 1.0 per cent.; total, 100.0 per cent.

December 31st, 1907. The sixth specimen of blood was prepared at 11:00 a. m., and at noon 5 mgrm. tuberculin were injected. Temperature, 99° F. This specimen of blood was spoiled through poor technique.

January 2nd, 1908. The seventh specimen of blood was prepared at 11:00 a. m.; temperature, 101.2° F. Polymorphonuclear neutrophils, 84.6 per cent.; lymphocytes, 13.2 per cent.; large mononuclears, 2.0 per cent.; transitionals, 0.2 per cent.; total, 100.0 per cent. Twenty-four hours after the injection of the last dose of tuberculin, the temperature reached 103° F. on three occasions.

CASE V.—The fifth case occurred in a colored, adult female, who was a patient of Dr. W. Campbell Posey, in the Wills Hospital, Philadelphia. The patient was suffering from tuberculous keratitis. The eosinophils at the beginning of the observation formed 4.2 per cent. of the leucocytes in the circulating blood. There was an increase on one occasion to 8.4 per cent., after the first injection of 1 mgrm. tuberculin. Twenty-four hours after the injection of 3 mgrm. tuberculin, the temperature began to rise and reached 103° F., its highest point, in a little over forty-eight hours.

December 26th, 1907. The first specimen of blood was prepared at 5 p. m. 1 mgrm. tuberculin was injected immediately after. Polymorphonuclear neutrophils, 35.4 per cent.; lymphocytes, 35.6 per cent.; large mononuclears, 18.6 per cent.; transitionals, 4.6 per cent.; eosinophils, 4.2 per cent.; basophils, 0.8 per cent.; myelocytes, 0.8 per cent.; total, 100.0 per cent.

December 27th, 1907. The second specimen of blood was prepared at 11 a. m.; temperature, 98.8° F. Polymorphonuclear neutrophils, 52.4 per cent.; lymphocytes, 26.4 per cent.; large mononuclears, 13.2 per cent.; transitionals, 2.6 per cent.; eosinophils, 4.8 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

December 28th, 1907. The third specimen of blood was prepared at 11 a. m.; temperature, 98.8° F. 3 mgrm. tuberculin were injected at noon. Polymorphonuclear neutrophils, 41.6 per cent.; lymphocytes, 24.2 per cent.; large mononuclears, 24.0 per cent.; transitionals, 1.2 per cent.; eosinophils, 8.4 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

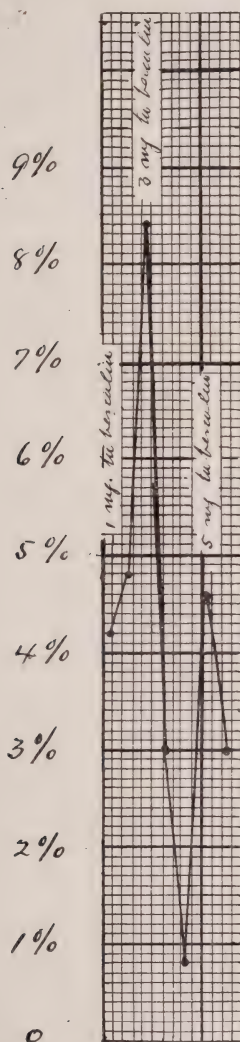
December 29th, 1907. The fourth specimen of blood was prepared at 5 p. m.; temperature, 101.8° F. Polymorphonuclear neutrophils, 66.2 per cent.; lymphocytes, 18.4 per cent.; large mononuclears, 9.6 per cent.; transitionals, 2.6 per cent.; eosinophils, 3.0 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

December 30th, 1907. The fifth specimen of blood was prepared at 11 a. m.; temperature, 102.2° F. Polymorphonuclear neutrophils, 73.0 per cent.; lymphocytes, 20.4 per cent.; large mononuclears, 3.2 per cent.; transitionals, 2.6 per cent.; eosinophils, 0.8 per cent.; total, 100.0 per cent.

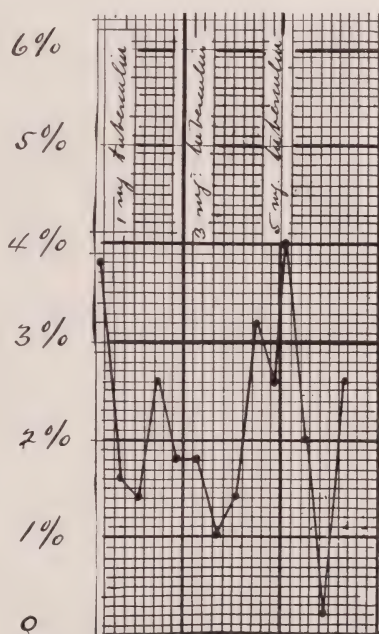
December 31st, 1907. The sixth specimen of blood was prepared at 11 a. m.; temperature, 100° F. immediately after 5 mgrm. tuberculin were injected. Polymorphonuclear neutrophils, 40.2 per cent.; lymphocytes, 12.8 per cent.; large mononuclears, 3.0 per cent.; eosinophils, 4.6 per cent.; degenerates, 39.4 per

cent.; total, 100.0 per cent. This specimen of blood, on account of poor technique, showed a large percentage of degenerated and disintegrated forms.

January 2nd, 1908. The seventh specimen of blood was prepared at 11 a. m.; temperature, 99° F. Polymorphonuclear neutrophils, 40.8 per cent.; lymphocytes, 44.2 per cent.; large mononuclears, 9.6 per cent.; transitionals, 1.6 per cent.; eosinophils, 3.0 per cent.; basophils, 0.4 per cent.; myelocytes, 0.4 per cent.; total, 100.0 per cent.



Case V.—Female, *wt.* twenty-five.



Case VI.—Female, *wt.* forty-four.

CASE VI.—The sixth case occurred in a white female, *wt.* forty-four, who was a patient of Dr. James K. Young, in the Polyclinic Hospital, Philadelphia. The patient was supposed to have tuberculosis of the vertebral column. In this case there was no eosinophilia and the tuberculin reaction was negative. There was no elevation of temperature after either injection of tuberculin. The highest temperature recorded after the 1 mgrm. dose was 99° F.; after the 3 mgrm. dose, 99.2° F.; after the 5 mgrm. dose, 98.8° F.

November 11th, 1909. The first specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 58.0 per cent.; lymphocytes, 31.4 per cent.; large mononuclears, 3.6 per cent.; transitionals, 3.2 per cent.; eosinophils, 3.8 per cent.; total, 100.0 per cent.

The second specimen of blood was prepared at 3:30 p. m. Polymorphonuclear neutrophils, 56.0 per cent.; lymphocytes, 38.8 per cent.; large mononuclears, 1.0 per cent.; transitionals, 2.2 per cent.; eosinophils, 1.6 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent. 1 mgrm. tuberculin was injected at 3:30 p. m.

November 12th, 1909. The third specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 55.6 per cent.; lymphocytes, 36.6 per cent.; large mononuclears, 2.0 per cent.; transitionals, 3.8 per cent.; eosinophils, 1.4 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

The fourth specimen of blood was prepared at 3:30 p. m. Polymorphonuclear neutrophils, 57.6 per cent.; lymphocytes, 34.2 per cent.; large mononuclears, 2.6 per cent.; transitionals, 2.6 per cent.; eosinophils, 2.6 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent.

November 13th, 1909. The fifth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 58.8 per cent.; lymphocytes, 30.8 per cent.; large mononuclears, 5.0 per cent.; transitionals, 3.2 per cent.; eosinophils, 1.8 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent.

The sixth specimen of blood was prepared at 4 p. m. Polymorphonuclear neutrophils, 63.8 per cent.; lymphocytes, 28.0 per cent.; large mononuclears, 3.0 per cent.; transitionals, 3.4 per cent.; eosinophils, 1.8 per cent.; total, 100.0 per cent. 3 mgrm. tuberculin were injected at 4 p. m.

November 14th, 1909. The seventh specimen of blood was prepared at 9:30 a. m. Polymorphonuclear neutrophils, 66.2 per cent.; lymphocytes, 24.8 per cent.; large mononuclears, 5.4 per cent.; transitionals, 2.6 per cent.; eosinophils, 1.0 per cent.; total, 100.0 per cent.

The eighth specimen of blood was prepared at 3:30 p. m. Polymorphonuclear neutrophils, 57.8 per cent.; lymphocytes, 37.2 per cent.; large mononuclears, 0.6 per cent.; transitionals, 3.2 per cent.; eosinophils, 1.4 per cent.; total, 100.0 per cent.

November 15th, 1909. The ninth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 62.0 per cent.; lymphocytes, 26.8 per cent.; large mononuclears, 2.4 per cent.; transitionals, 4.8 per cent.; eosinophils, 3.2 per cent.; basophils, 0.8 per cent.; total, 100.0 per cent.

The tenth specimen of blood was prepared at 6 p. m. Polymorphonuclear neutrophils, 32.6 per cent.; lymphocytes, 60.0 per cent.; large mononuclears, 1.8 per cent.; transitionals, 2.6 per cent.; eosinophils, 2.6 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent. 5 mgrm. tuberculin were injected at 6 p. m.

November 16th, 1909. The eleventh specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 71.2 per cent.; lymphocytes, 18.8 per cent.; large mononuclears, 2.4 per cent.; transitionals, 3.4 per cent.; eosinophils, 4.0 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

The twelfth specimen of blood was prepared at 4 p. m. Polymorphonuclear neutrophils, 52.2 per cent.; lymphocytes, 39.0 per cent.; large mononuclears, 5.0 per cent.; transitionals, 1.6 per cent.; eosinophils, 2.0 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

November 17th, 1909. The thirteenth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 78.6 per cent.; lymphocytes, 15.8 per cent.; large mononuclears, 2.2 per cent.; transitionals, 3.0 per cent.; eosinophils, 0.2 per cent.; basophils, 0.2 per cent.; total, 100.0 per cent.

The fourteenth specimen of blood was prepared at 4 p. m. Polymorphonuclear neutrophils, 51.4 per cent.; lymphocytes, 33.2 per cent.; large mononuclears, 8.0

per cent.; transitionals, 4.2 per cent.; eosinophils, 2.6 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent.

CASE VII.—The seventh case occurred in a white male, who was a patient of Dr. A. A. Eshner and Dr. James K. Young, in the Philadelphia Polyclinic Hospital.

The first injection of 1 mgrm. tuberculin was made at 3 p. m. on January 25th, 1910. On January 26th, the patient's temperature rose to 103° F., and the patient had an attack of tonsillitis. A culture made from the throat showed that the disease was due to infection with staphylococci and diplococci. No diphtheria bacilli were found. One mgrm. tuberculin was again administered on February 3rd, 1910. 3 mgrm. tuberculin on February 4th, 1910, and 5 mgrm. were administered on February 5th, 1910. There was no elevation of temperature after the administration of the increasing doses of tuberculin. The highest eosinophil percentage recorded was 4.0, forty-eight hours after the injection of 5 mgrm. tuberculin.

January 24th, 1910. The first specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 55.0 per cent.; lymphocytes, 34.2 per cent.; large mononuclears, 1.8 per cent.; transitionals, 2.0 per cent.; eosinophils, 6.4 per cent.; basophils, 0.6 per cent.; total, 100.0 per cent. One normoblast seen in counting 500 leucocytes.

January 25th, 1910. The second specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 84.4 per cent.; lymphocytes, 11.8 per cent.; large mononuclears, 0.2 per cent.; transitionals, 2.0 per cent.; eosinophils, 1.2 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent.

The third specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 74.4 per cent.; lymphocytes, 16.4 per cent.; large mononuclears, 2.6 per cent.; transitionals, 4.4 per cent.; eosinophils, 1.8 per cent.; basophils, 0.4 per cent.; total, 100.0 per cent. 1 mgrm. tuberculin was injected.

January 26th, 1910. The fourth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 72.6 per cent.; lymphocytes, 18.6 per cent.; large mononuclears, 4.4 per cent.; transitionals, 3.0 per cent.; eosinophils, 0.6 per cent.; basophils, 0.8 per cent.; total, 100.0 per cent.

The fifth specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 75.0 per cent.; lymphocytes, 19.6 per cent.; large mononuclears, 1.2 per cent.; transitionals, 3.8 per cent.; eosinophils, 0.4 per cent.; total, 100.0 per cent.

January 27th, 1910. The sixth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 80.2 per cent.; lymphocytes, 14.0 per cent.; large mononuclears, 1.2 per cent.; transitionals, 3.6 per cent.; eosinophils, 1.0 per cent.; total, 100.0 per cent. February 3rd, 1910, 1 mgrm. tuberculin was injected.

February 4th, 1910. The seventh specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 79.0 per cent.; lymphocytes, 13.8 per cent.; large mononuclears, 2.2 per cent.; transitionals, 3.0 per cent.; eosinophils, 2.0 per cent.; total, 100.0 per cent.

The eighth specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 82.4 per cent.; lymphocytes, 14.8 per cent.; large mononuclears, 0.4 per cent.; transitionals, 1.6 per cent.; eosinophils, 0.8 per cent.; total, 100.0 per cent. 3 mgrm. tuberculin injected.

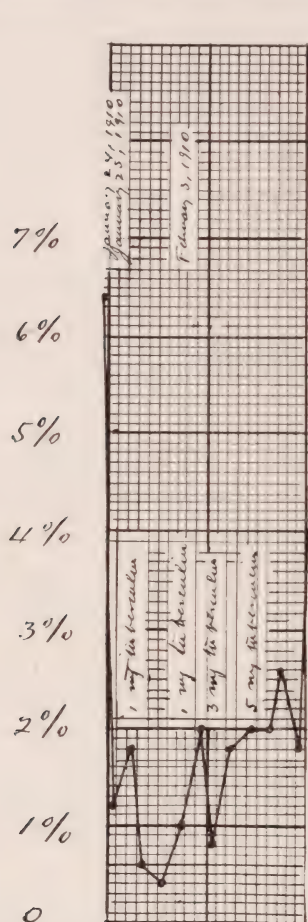
February 5th, 1910. The ninth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 75.6 per cent.; lymphocytes, 19.2 per cent.; large mononuclears, 1.2 per cent.; transitionals, 2.2 per cent.; eosinophils, 1.8 per cent.; total, 100.0 per cent.

The tenth specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 68.6 per cent.; lymphocytes, 21.0 per cent.; large mononuclears, 3.0

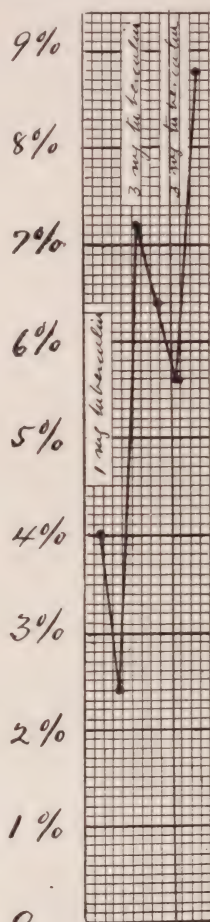
per cent.; transitionals, 5.4 per cent.; eosinophils, 2.0 per cent.; total, 100.0 per cent. 5 mgrm. tuberculin injected.

February 6th, 1910. The eleventh specimen of blood was prepared at 9:30 a. m. Polymorphonuclear neutrophils, 78.0 per cent.; lymphocytes, 12.4 per cent.; large mononuclears, 2.4 per cent.; transitionals, 5.2 per cent.; eosinophils, 2.0 per cent.; total, 100.0 per cent.

The twelfth specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 74.4 per cent.; lymphocytes, 14.0 per cent.; large mononuclears, 5.4



Case VII.—Male, *wt.* unknown.



Case VIII.—Male, *wt.* four.

per cent.; transitionals, 3.6 per cent.; eosinophils, 2.6 per cent.; total, 100.0 per cent.

February 7th, 1910. The thirteenth specimen of blood was prepared at 9 a. m. Polymorphonuclear neutrophils, 82.4 per cent.; lymphocytes, 9.6 per cent.; large mononuclears, 2.4 per cent.; transitionals, 3.8 per cent.; eosinophils, 1.8 per cent.; total, 100.0 per cent.

The fourteenth specimen of blood was prepared at 3 p. m. Polymorphonuclear neutrophils, 76.6 per cent.; lymphocytes, 15.4 per cent.; large mononuclears, 1.0 per cent.; transitionals, 3.0 per cent.; eosinophils, 4.0 per cent.; total, 100.0 per cent.

CASE VIII.—The eighth case occurred in a male child, *et.* four, who was a patient of Dr. Francis T. Stewart, in the Polyclinic Hospital.

The result of the tuberculin test was not typical. After the first injection of 1 mgrm., the temperature rose to 101° F., on January 26th, 1908. On January 28th, 1908, 3 mgrm. tuberculin were given, but there was no elevation of temperature, the temperature being 99.4° F. On January 30th, 1908, 3 mgrm. of tuberculin were again injected. This injection was followed by an elevation of temperature to 101.4° F. On January 31st, 1908, 5 mgrm. tuberculin were given after which the highest temperature recorded was 99.2° F. In this case, after the injection of the second dose of 3 mgrm. tuberculin, the eosinophil cells formed 8.8 per cent. of the leucocytes in the peripheral blood.

The first specimen of blood was prepared January 26th, 1908. Polymorphonuclear neutrophils, 48.2 per cent.; lymphocytes, 42.8 per cent.; large mononuclears, 3.0 per cent.; transitionals, 2.0 per cent.; eosinophils, 4.0 per cent.; total, 100.0 per cent. 1 mgrm. tuberculin was injected.

The second specimen of blood was prepared January 27th, 1908. Polymorphonuclear neutrophils, 62.2 per cent.; lymphocytes, 31.0 per cent.; large mononuclears, 2.2 per cent.; transitionals, 2.2 per cent.; eosinophils, 2.4 per cent.; total, 100.0 per cent.

The third specimen of blood was prepared January 28th, 1908. Polymorphonuclear neutrophils, 44.2 per cent.; lymphocytes, 42.0 per cent.; large mononuclears, 4.6 per cent.; transitionals, 2.0 per cent.; eosinophils, 7.2 per cent.; total, 100.0 per cent. 3 mgrm. tuberculin were injected.

The fourth specimen of blood was prepared January 29th, 1908. Polymorphonuclear neutrophils, 44.0 per cent.; lymphocytes, 47.8 per cent.; large mononuclears, 1.2 per cent.; transitionals, 0.4 per cent.; eosinophils, 6.4 per cent.; myelocytes, 0.2 per cent.; total, 100.0 per cent.

The fifth specimen of blood was prepared January 30th, 1908. Polymorphonuclear neutrophils, 37.4 per cent.; lymphocytes, 51.8 per cent.; large mononuclears, 4.4 per cent.; transitionals, 0.8 per cent.; eosinophils, 5.6 per cent.; total, 100.0 per cent. 3-mgrm. tuberculin were injected.

The sixth specimen of blood was prepared January 31st, 1908. Polymorphonuclear neutrophils, 46.2 per cent.; lymphocytes, 35.4 per cent.; large mononuclears, 3.0 per cent.; transitionals, 5.8 per cent.; eosinophils, 8.8 per cent.; basophils, 0.4 per cent.; myelocytes, 0.4 per cent.; total, 100.0 per cent.

After this blood-count was made, 5 mgrm. tuberculin were injected, but the differential counts made after this injection have been lost.

The tuberculin used in these cases was supplied to the writer by Dr. S. H. Gilliland, at that time Director of the Bacteriological Laboratories of the Pennsylvania State Live Stock Sanitary Board, except that used in Case II, which was bought from a firm engaged in the manufacture of biological products.

The writer's thanks are due to Dr. Charles H. Frazier, Dr. Alfred Stengel, Dr. James K. Young, Dr. W. Campbell Posey, Dr. A. A. Eshner, and Dr. Francis T. Stewart for permission to use their clinical material, and to Dr. Benjamin A. Thomas for assistance in making the smears from Case I.

SUMMARY.

The paper gives the details of the differential leucocyte counts in 8 cases in which tuberculin injections were made for diagnostic purposes,

in order to determine, if possible, the influence of tuberculin on the eosinophil leucocytes.

Case I: Eosinophils before the injection of tuberculin, 2.3 per cent., 3.2 per cent.; after the injection of 5 mgrm. tuberculin, 7.8 per cent. Tuberculin test positive.

Case II: Eosinophils before the injection of tuberculin, 0.4 per cent., 0.2 per cent.; after the injection of 3 mgrm. tuberculin, the eosinophils disappeared from the peripheral blood and remained absent until the patient died. Reaction, negative.

Case III: Eosinophils before the injection of tuberculin, 5.6 per cent., 5.0 per cent. (*ascaris lumbricoides* infection); after the injection of 5 mgrm. tuberculin, 10.8 per cent. Reaction, positive.

Case IV: Eosinophils before the injection of tuberculin, 5.2 per cent.; after 3 mgrm. tuberculin were injected, 9.0 per cent.; after 5 mgrm. tuberculin were injected, the eosinophils disappeared. Reaction, positive.

Case V: Eosinophils before the injection of tuberculin, 4.2 per cent.; after the injection of 1 mgrm. tuberculin, 8.4 per cent. Reaction, positive.

Case VI: Eosinophils before the injection of tuberculin, 3.8 per cent., 1.6 per cent.; after the injection of tuberculin, no increase in the eosinophils. Reaction, negative.

Case VII: Eosinophils before the injection of tuberculin, 6.4 per cent., 1.2 per cent.; after the injection of 5 mgrm. tuberculin, 4.0 per cent. Reaction, negative.

Case VIII: Eosinophils before the injection of tuberculin, 4.0 per cent.; after the injection of 3 mgrm. tuberculin, 8.8 per cent. Reaction, positive.

In these 8 cases eosinophilia was seen after the injection of tuberculin for diagnostic purposes in 5 cases and was absent in 3 cases. In the 5 cases in which eosinophilia was observed there was a positive reaction. In the 3 cases in which eosinophilia was not found, the reaction was negative. One might draw two conclusions from these results: First, that eosinophilia is due to the fever accompanying a positive reaction; secondly, that after the injection of 5 mgrm. tuberculin in a person who is not suffering from bacillus tuberculosis infection, not enough tuberculin is administered to produce the eosinophilia.

The first conclusion must be rejected because all elevations of temperature are not accompanied by eosinophilia. The second conclusion may or may not be justified. The writer has no evidence to offer upon that point.

BIBLIOGRAPHY.

- 1 Swan (*Journ. Amer. Med. Assoc.*, Vol. XLII, p. 696, 1904).
- 2 Swan and Karsner (*New York Med. Journ.*, Vol. LXXXV, p. 539, 1907).
- 3 Levaditi: *Le Leucocyte et ses Granulations*, p. 117. 1902.
- 4 Zappert (*Zeitschr. fuer klin. Med.*, Vol. XXIII, 1893).

- 5 Bischoff: Blutuntersuchungen an mit Tuberculin behandelten Tuberculösen.
(Inaugural Dissertation, Berlin, 1891.)
- 6 Botkin (*Deutsch. med. Wochenschr.*, Vol. XVIII, p. 321, 1892).
- 7 Smith, Mullen and Rivas (*Proc. Path. Soc. Philadelphia*, Vol. XIV, p. 20, 1911).
- 8 Ullom and Craig (*Amer. Journ. Med. Sciences*, Vol. CXXX, p. 386, 1905).
- 9 Wright and King (*Amer. Journ. Med. Sciences*, Vol. CXLI, p. 852, 1911).
- 10 Miller and Reed (*Archives Int. Med.*, Vol. IX, p. 609, 1912).
- 11 Rayevsky (*New York Med. Journ.*, Vol. XCVII, p. 813, 1913).
- 12 Solis-Cohen and Strickler (*Amer. Journ. Med. Sciences*, Vol. CXLII, p. 691, 1911).

THE DIFFERENTIAL DIAGNOSIS BETWEEN ACUTE EPIDEMIC POLIOMYELITIS AND AFFECTIONS HAVING POLIOMYELITIS SYNDROMES.

By EDWARD AFFLECK SHARP, M. D., of Buffalo, N. Y.

The epidemic of poliomyelitis in Buffalo during 1912 was of sufficient extent and severity to produce some apprehension that any illness with febrile or nervous symptoms, contracted during that time, might be poliomyelitis; and, as a result, a number of suspicious cases were reported to the Health Department.

While the regular types of poliomyelitis, as well as the milder and aborted forms, are usually easily recognized during an epidemic, there is also the liability to overstep the limits of the disease and to consider other affections, having some similar symptoms, as cases of epidemic poliomyelitis. In other cases, the differential diagnosis between acute poliomyelitis and acute myelitis, polyneuritis and some forms of meningitis or meningomyelitis may be very difficult, if not impossible, clinically.

The type of poliomyelitis occurring in epidemics is an acute, specific, infectious disease in which the motor symptoms, which give it the name poliomyelitis, are only a part of the symptomatology; and the infection may run its course without any involvement of the motor functions.

The specific nature of the infection has been demonstrated by the experimental work in transmission to monkeys; by the serum reaction in neutralizing the virus from active cases; and by the immunity from a second attack which is observed both clinically and experimentally. By these same reactions it has been possible to show that some of the sporadic cases are also due to the same infection, the difference between the sporadic and epidemic forms being largely a matter of virulence.

The same motor and meningeal symptoms that occur in epidemic poliomyelitis may also occur during the course of some of the other acute infectious diseases: notably measles, scarlet fever, influenza, variola, erysipelas, etc.; and this fact has given rise to differences of opinion regarding the nature of poliomyelitis.

Buzzard¹ thinks the argument that poliomyelitis frequently follows some of the infectious diseases is not to be regarded seriously as evidence against the specific nature of poliomyelitis, and that "there are plenty of instances of acute specific fever following quickly on the heels of another without any suggestion forthcoming that the latter condition is a result of the earlier one."

Claude,² however, is an advocate of the dualistic theory, and considers poliomyelitis a syndrome occurring in various infections, one of which

is that producing the epidemic form, but the same syndrome is also found in other infections.

Some of the cases observed during and following the 1912 epidemic would favor the view that many of the symptoms of acute epidemic poliomyelitis are reproduced in other affections and may lead to difficulties in the diagnosis. This has been particularly so with tubercular meningitis and some other forms of meningitis, and with the motor symptoms accompanying measles, erysipelas, streptococcus infections, etc.

A fairly typical example of the poliomyelitis syndrome occurring during the course of an infectious disease is shown in the case of a child four years of age, who, in December, 1912, developed weakness of the right lower extremity with pains and tenderness on pressure and movements, pains and stiffness in the neck and back and inability to walk. At the same time the child developed a coryza and broke out into a typical measles rash. Two days later the power returned in the paralyzed extremity and complete recovery followed.

In August, 1912, a child nine months old was sent to the Ernest Wende Hospital as a case of epidemic poliomyelitis with severe meningeal symptoms—pain and rigidity of the neck and back—symptoms which are so frequently seen in the early stages of poliomyelitis, but without paralysis. The child had been bitten on the scalp by an insect eight days previously, and the scalp and face were red and swollen. In the hospital the disease took the form of a severe facial erysipelas with meningeal involvement, and the child recovered without paralysis.

In another case with severe meningeal symptoms in a child twenty months old, admitted to the hospital as epidemic poliomyelitis, the cause of the meningitis was found to be hereditary syphilis. The Wassermann reaction was later found to be strongly positive, and the symptoms subsided under proper treatment. Zadik³ has reported 2 cases of poliomyelitis in adults due to syphilis.

Cases of tubercular meningitis occurring during a poliomyelitis epidemic present many difficulties in the immediate diagnosis, and even the examination of the cerebrospinal fluid may not at once be decisive. In the 4 cases recorded by Russell⁴ the cytology was similar to poliomyelitis. In 2 of these cases and in some of the later ones the tubercle bacilli were found in the fluid and the diagnosis established.

Russell also records one instance in which the spinal fluid gave the characteristic poliomyelitis findings, but which proved later to be typhoid fever with meningeal symptoms.

During the course of typhoid fever symptoms referable to the meninges or spinal cord are not uncommon, and the meningomyelitis thus produced may simulate poliomyelitis. Vipond,⁵ of Montreal, has called attention to a number of similarities between epidemic poliomyelitis and typhoid fever in regard to seasonal incidence, incubation period, etc., and he found a positive Widal reaction in 6 cases of poliomyelitis out of 16 cases examined.

The poliomyelitis syndrome may occur in infections the nature of which is not easily determined, and the spinal fluid may show changes radically different from the ordinary epidemic poliomyelitis.

During February, 1913, a child six months old became suddenly ill with fever, vomiting, diarrhea, and had a generalized convulsion, but most severe in the right arm. After the convulsion the right arm was paralyzed and the right side of the face was weak. The arm was tender to manipulation and there was marked stiffness of the neck and back. The child was admitted to the hospital as poliomyelitis, and lumbar puncture was performed on the seventh day of the illness. The fluid was under increased pressure and was turbid, and on this account the child was given 10 c.cm. of the Flexner serum without waiting for a report on the bacteriology of the fluid. Examination by Dr. N. G. Russell showed a cell count of over 700 per c.mm. with 64 per cent. polynuclears, an increased globulin and sugar reaction; but no organisms were found. The serum injection was not repeated owing to the absence of meningococci, but the child improved rapidly and recovered the normal function of the arm. A second examination, one week later, gave the cell count about 100, mostly polynuclears.

The high cell count of polynuclears on the seventh day, and later, is not like the usual findings in epidemic poliomyelitis where the predominating cells at that stage are lymphocytes. In the cases of cerebrospinal meningitis due to the meningococcus the organisms are usually abundant, both intra- and extra-cellular, and the cells are mostly polynuclear. According to Debré⁶ it is sometimes necessary to look with great care to find the organisms. The above case was probably not epidemic poliomyelitis, but the nature of the infection could not be determined.

The diagnosis between poliomyelitis and polyneuritis may be very difficult or impossible without lumbar puncture, as many of the typical epidemic poliomyelitis cases have severe pains and tenderness in the extremities and form a special type designated by Wickmann as polyneuritic. If the meningeal symptoms are very severe, it usually indicates poliomyelitis rather than neuritis.

During the first week in September a girl six years old was taken ill with a severe sore throat. Two days later she complained of some pain in the back and extreme tenderness in the feet and muscles of the legs. The tenderness was so severe that the child would not attempt to walk, although the power was apparently normal in the extremities, but the tendon reflexes were absent. The tonsils and throat were inflamed and coated, and a severe stomatitis was present, but no skin eruption. There was no rigidity of the neck or back. Cultures from the throat did not show diphtheria. The case recovered completely and the neuritis was probably dependent on a streptococcus or mixed infection in the throat. Lumbar puncture was not permitted.

One of the cases of considerable importance regarding the differential

diagnosis, as shown by the subsequent history of the case, was that of a boy three years old admitted to the hospital in July, 1912. Two weeks previously he had had fever, vomiting, diarrhea, twitchings in the extremities and a discharge from the nose. On admission both legs were in a flaccid paralysis and the child complained of pains in the knees. He was sent to the hospital as a case of poliomyelitis and was considered such during his stay there. After three weeks he was able to walk about with a high-stepping gait due to loss of all movements below the knees—a flaccid paralysis with double foot-drop. The extent of the paralysis is shown in Chart 1. The patellar tendon reflex was present and equal

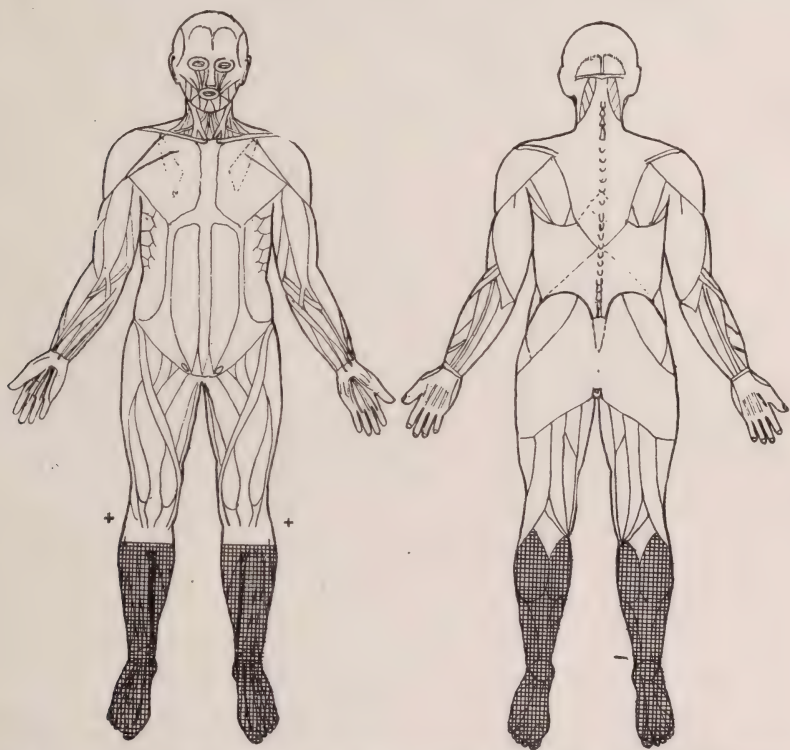


Chart No. 1.—Symmetrical paralysis of distal portions of lower extremities. A common type in peripheral neuritis and occurring also in poliomyelitis.

on both sides, but the Achilles tendon reflex was absent bilaterally, and there was no response to plantar irritation. There were no objective sensory changes in the parts paralyzed.

During the next five months the child gradually regained the full power in the legs, walked normally and the absent reflexes returned. He remained well until April, 1913, when he was taken ill with symptoms similar to those of last July—fever, gastro-intestinal disturbances, etc.; and after the acute symptoms had subsided the anterior tibial group of muscles was found paralyzed and the foot held in the equinus position

from overaction of the posterior leg muscles. For several weeks the legs were very tender, but at no time was any rigidity of the neck or back observed. There has been a slow return to nearly normal function up to the present time, three months since the onset.

In this case the diagnosis of epidemic poliomyelitis becomes questionable in the light of the history subsequent to the first attack. The second attack was probably a polyneuritis, the result of a gastro-intestinal toxemia, and the first attack may have been similar, although polyneuritis in children is rare compared to poliomyelitis. One attack of epidemic poliomyelitis confers immunity, and if the pathology in this case was that of a poliomyelitis, it was due to some infection or toxin other than that producing the epidemic form. Flexner⁷ states that "one attack of poliomyelitis is insurance against a second one," and Wickmann in his large experience has never observed a second attack. In Eshner's case the evidence is not conclusive that both attacks were epidemic poliomyelitis.⁸

Another class of cases in which the clinical symptoms may show close resemblances to poliomyelitis are the acute ascending or transverse type of myelitis, and some of the myelitis cases may rarely be produced by the virus of poliomyelitis. Harbitz and Scheel,⁹ in discussing the pathology of fatal cases of poliomyelitis, state that the inflammatory process may extend over the entire cord, medulla, etc., and that if the inflammation is more marked in a particular region it may produce the clinical picture of transitional forms to other diseases such as transverse myelitis. A transverse myelitis type of poliomyelitis has been described by Skoog,¹⁰ but there is no evidence to support his claim that this case was due to the epidemic poliomyelitis infection. Sachs,¹¹ however, has reported a case of acute infectious transverse myelitis due to the virus of poliomyelitis, with complete recovery. The poliomyelitis nature of the infection was proved by the neutralization tests in the blood-serum.

In the following 2 cases poliomyelitis had been reported as the cause of the myelitis, but the later history did not confirm it:—

CASE I.—In June, 1913, a woman, *æt.* thirty-nine, was sent to the hospital, as a case of poliomyelitis on account of the gradual loss of power extending from the feet up to the chest. Sensory changes were found accompanying the motor loss and there developed complete loss of all sensation up to segment D viii, with diminution of sensibility above this to D ii. The sensory changes are indicated in Chart 2. The clinical course of the disease was typical of an acute ascending myelitis, and the motor, sensory and sphincter loss continued unchanged until the time of death, seven weeks from the onset. Autopsy was not permitted. The nature of the infection could not be determined; no organisms were found in the cerebrospinal fluid and the Wassermann reaction was negative.

CASE II.—In a boy nine years old, who died as the result of a streptococcus infection, the early clinical course of the illness was quite similar to poliomyelitis. Following the usual prodromal symptoms of malaise, fever, drowsiness, pains in the back, etc., the boy developed weakness in the left leg and fell on attempts to walk. The next day the right leg was involved and then all movements in the lower extremities were lost. Drowsiness soon passed to coma and

the patient made no response to painful stimuli over any portion of the body. Examination of the spinal fluid by Dr. Russell showed eleven cells per c. mm. The temperature gradually rose to $107\frac{1}{2}^{\circ}$ F., and the patient died four days after the onset of the symptoms. At the autopsy the brain was found edematous and the meninges intensely injected. The spinal cord showed injection of the blood-vessels of the pia, but no exudate on the surface. Hemorrhages in the walls of the left ventricle of the heart and a mild degree of cloudy swelling of the kidneys were found.

Microscopical examination of the cord showed a diffuse hemorrhagic myelitis, and similar disseminated hemorrhages were found throughout the brain in the specimens prepared by Dr. J. L. Eckel. Bacteriological examination by Dr. W. F. Jacobs showed the cause of the myelitis to be a streptococcus infection.

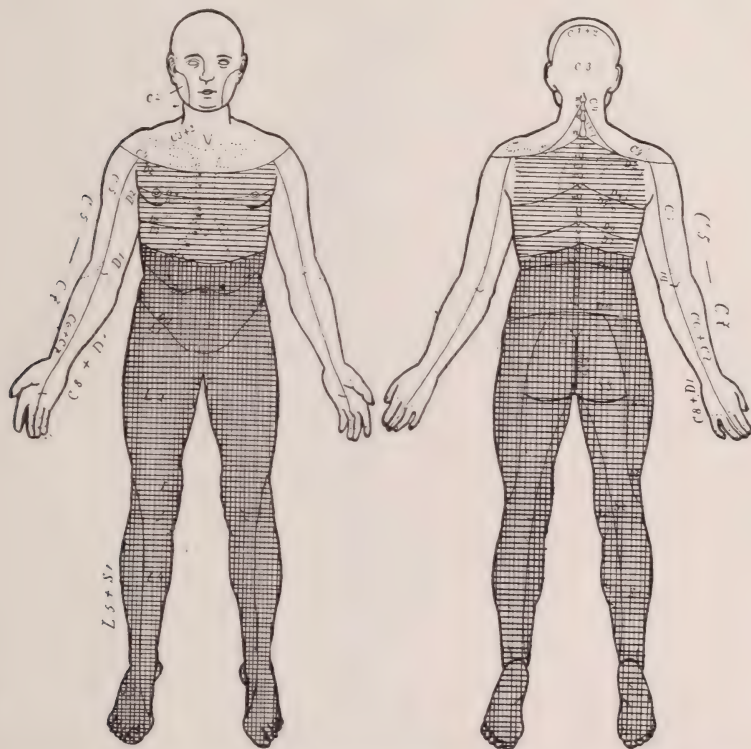


Chart No. 2.—Showing sensory loss in acute ascending transverse myelitis.

Kennedy¹² mentions an arthritic type of poliomyelitis which has been described and which is difficult to differentiate clinically from rheumatic fever.

Several cases having severe pains and tenderness in the joints were observed during the epidemic, but the other symptoms of poliomyelitis were sufficiently prominent to decide the diagnosis. Two cases, however, were reported in which the arthritis was not due to poliomyelitis. In one of these cases, in a girl nineteen years old, the knees were swollen, tender and held rigidly in extension, and the loss of function was thought to be

due to poliomyelitis. Examination of a discharge from the cervix showed diplococci, and the arthritis was probably due to a Neisser infection.

During the height of the epidemic 2 cases of hysteria were reported as suspicious in girls who had come in contact with poliomyelitis cases. One girl developed sudden loss of all movements of the left arm and loss of sensation over the left side of the face, neck, chest and upper extremity, with diminished sensibility over the abdomen and left lower extremity (Chart 3). The reflexes were normal and symmetrical. Other stigmata of hysteria were also present.

Among other cases which were reported as suspicious because occur-

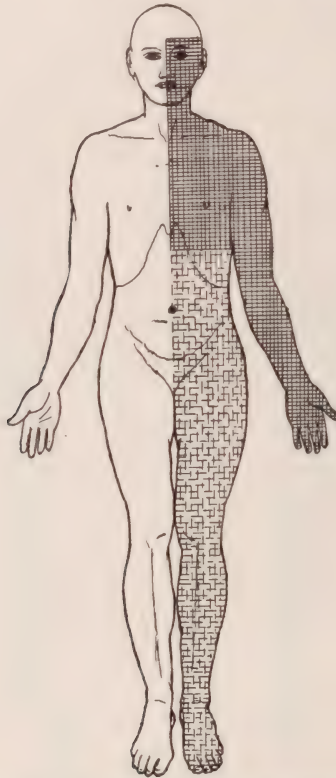


Chart No. 3.—Hysterical hemianesthesia.

ring during an epidemic were 2 cases of musculo-spiral pressure paralysis, one case of pressure myelitis from spinal cord tumor, one case of temporary hemiplegia from lead encephalopathy, and one case of tetany.

Included among the cases examined were 7 cases of gastro-intestinal disturbance, but without other symptoms of poliomyelitis. As they occurred during an epidemic they may have been mild abortive attacks, but without other evidence they were considered merely as suspicious and not included in the statistics of the aborted attacks.

Several cases came under observation where a true poliomyelitis had

been overlooked and the loss of function attributed to a fall or other accident.

One case presented certain medicolegal aspects which were averted by discovering the cause of the paralysis. A girl of four years fell over the back of a chair and sustained a fracture of the right forearm. Proper surgical attention was given and the radiographic examination showed proper position and good union. When the splints were permanently removed and the child urged to use the arm it was found in a flaccid paralysis. The surgeon, thinking he had to deal with a pressure paralysis from the splint, sent the case for consultation. The paralysis of the

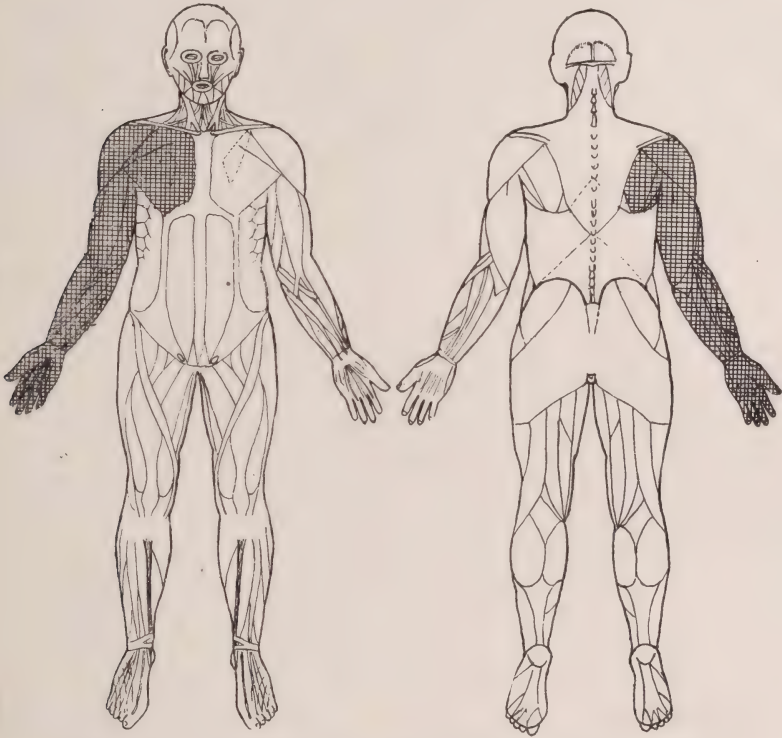


Chart No. 4.—Poliomyelitis paralysis of right upper extremity.

right upper extremity was so complete that the loss of function could not be accounted for by the pressure of a surgical dressing below the elbow. There were no sensory changes in the paralyzed extremity. The extent of the paralysis is shown in Chart 4.

It was then learned that ten days after the fracture the child had a febrile and gastro-intestinal disturbance, which the parents assumed was caused by the restrictions imposed by the fracture and the pain, and did not call the physician's attention to it.

The case proved to be a typical poliomyelitis paralysis in which the

affected extremity was immobilized by surgical dressings at the time of the attack and the paralysis was not discovered until three weeks later.

In conclusion it is seen that some of the motor and meningeal symptoms characteristic of acute epidemic poliomyelitis may also occur during the course of other infections, or as the result of other causes, and that during an epidemic these latter cases may be mistaken for poliomyelitis.

While some of the cases present symptoms which make differential diagnosis very difficult, others could only be mistaken for poliomyelitis during an epidemic where the fear of infection is foremost in mind.

There is no condition of the spinal fluid which is positively diagnostic of epidemic poliomyelitis; but the examination is of value in eliminating such diseases as tubercular meningitis, cerebrospinal meningitis, etc., when the characteristic organisms are found in the fluid.

The serum reactions and immunity tests are of diagnostic value, but are not practicable as clinical methods in their present state of development; and until the specific organism or virus of poliomyelitis can be isolated and recognized by simple laboratory methods, there must remain considerable uncertainty regarding the diagnosis of some of the affections having poliomyelitis syndromes.

BIBLIOGRAPHY.

- ¹ Buzzard: Goulstonian Lectures. (*Lancet*, Vol. 1, 1907.)
- ² Claude (*Le Progrès Médical*, p. 69, 1911).
- ³ Zadik (*Berl. Klin. Wochenschr.*, No. 28, 1911).
- ⁴ Russell (*Journ. Nervous and Mental Dis.*, p. 298, 1913).
- ⁵ Vipond (*British Med. Journ.*, March 18th, 1911).
- ⁶ Debré (*La Clinique Infantile*, No. 17, 1911).
- ⁷ Flexner (*International Clinics*, Vol. 2, p. 114, 1912).
- ⁸ Eshner (*Med. Record*, September 24th, 1910).
- ⁹ Harbitz and Scheel (*Deutsch. med. Wochenschr.*, November 28th, 1907).
- ¹⁰ Skoog (*Journ. Amer. Med. Assoc.*, September 7th, 1912).
- ¹¹ Sachs (*Journ. Nervous and Mental Dis.*, p. 747, 1912).
- ¹² Kennedy (*New York State Journ. Med.*, p. 311, 1912).

WHAT DOES TREATMENT OFFER TO THE ADVANCED TUBERCULOUS PATIENT?

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The keynote of success in the treatment of all disease is early diagnosis and early application of the proper therapeutic measures. In spite of the fact that medical science has been able for the past fifteen years to offer an apparent cure for three out of every four patients who are suffering from tuberculosis, providing the diagnosis is made early and the proper treatment immediately instituted, yet we find a great many patients presenting themselves for treatment who are in the advanced stages of tuberculosis.

It is well for us to examine into the causes which contribute to this unfortunate state of affairs. The writer has often said that there is a time when every patient suffering from tuberculosis can be cured; but of those early cases that present themselves to us for treatment, it seems, from the average statistics of those who are making the best records in the treatment of tuberculosis, that about twenty to twenty-five per cent. are unable to secure a healing. Therefore, if the writer's first statement is true, we must face the fact that our so-called early diagnoses are being made too late in from 20-25 per cent. of cases. If we take this as the measure of the necessary mortality of early clinical tuberculosis, we can see that there is still a great percentage of patients who are unnecessarily passing on to an advanced hopeless stage, who should not do so. We will admit that there is a certain number of patients who, owing to the peculiar pathology of the disease, arrive at an advanced stage of the disease without knowing it; but this does not account for the larger number who develop recognizable symptoms which are either neglected by the patient or unrecognized by the physician until a serious condition presents itself.

The responsibility for early tuberculosis reaching an incurable stage must be borne both by the patient and the physician. Patients are inclined to neglect the early symptoms of this disease either through ignorance or through an attempt at deceiving themselves. Quite a percentage will not present themselves for examination during the early curable stage, and there is quite a percentage who, if they do have a diagnosis made, will not accept it. The writer fears, however, that the medical profession itself must really assume a good deal of this responsibility. Too often a patient, suffering from the early symptoms of

tuberculosis, seeks medical advice, and, instead of an examination and diagnosis being made, the patient is given some palliative remedy which will relieve the most prominent symptom. The writer often has patients tell him that they have begged and implored the physician to examine their chest and were greeted only with laughter at the idea of the presence of tuberculosis; and numerous instances have come under his observation where the patient collected the sputum and took it to the doctor and forced him to have it examined, and then when bacilli were found, in order to conceal his negligence, he usually told the patient that the examination showed "that there was not very much," but that "there was a little tuberculosis present." It would seem to the writer that if the modern physician could do nothing more for a patient where tuberculosis might be suspected, he could at least have any secretion that might be present examined microscopically. While he does not consider this the most important step in early diagnosis of tuberculosis, yet the writer feels sure that it would save a great many patients from going on to a hopeless condition, because it would help to make the diagnosis far earlier than it is being made.

Quite often, on the other hand, we find a patient who has been examined by a competent physician and been told that he has an early tuberculous lesion. Instead of accepting this diagnosis he either turns it aside as being of no consequence, or, through a certain degree of optimism—feeling well—thinks that he will get well without any difficulty, or consults other physicians who will tell him that nothing is wrong.

There is one type of tuberculosis that we meet quite often, which almost precludes an early diagnosis. It is the type where the patient becomes ill suddenly, probably without any previous warning, following a cold, a bronchitis, pneumonia, influenza; or, without any of these inciting factors, for some unaccountable reason a process, which had previously been dormant, suddenly becomes active. Under these circumstances a truly early diagnosis could only have been made months, or it might be years previously when the infection took place, or when it first began to manifest clinical symptoms. These cases usually present themselves to us with a sudden onset, showing a marked rise of temperature, considerable cough and expectoration, and symptoms which usually go with a markedly acute process. Some of these patients seem to be doomed from the beginning. No matter what we do they cannot be helped. On the other hand, quite a percentage of them, if put on proper treatment at once, can again be brought to a state of arrestment.

Advanced tuberculosis will continue to be prevalent until there is a closer association between family physicians and their patients, and until the laymen learn that a thorough examination is necessary in order to detect this disease early.

While it cannot be said that clinical tuberculosis is ever easily cured, yet if the proper treatment is instituted when the early symptoms first

appear, and if the patient will follow the prescribed course for a sufficiently long time, as large a percentage of patients suffering from this disease can be restored to health as of any other serious malady. But if the disease is allowed to progress, a very important advantage is lost.

Owing to the peculiar pathology of tuberculosis the disease becomes progressively more difficult to handle as it advances. The small tubercles, which characterize the disease in its incipiency, are easily reached by the circulating blood which carries with it the substances necessary to the production of healing. Later, however, this condition changes, the centre of the tubercles softens; the tubercles mass together and form large centres of caseation; the blood no longer reaches the inner portion of the mass, and the bacilli which are therein enclosed multiply, comparatively uninfluenced by the protective substances which may be freely circulating in the blood without the tubercles.

While the early tubercle is comparatively easy to heal, the centres of caseation are influenced slowly and are removed with difficulty. These cheesy masses may be small, almost microscopical, or they may become so large that they occupy a large pulmonary area.

When we attempt to heal advanced tuberculosis we are attempting to fortify the patient so that all danger of spreading of the disease to new tissues is removed, and to stimulate the tuberculous tissue so that those areas which are not necrotic will be transformed into scar tissue, and that the caseous masses will be separated and thrown off and the remaining ulcerating surfaces will heal. This is a difficult task, but one which can often be accomplished if sufficient time is expended.

Not only is the healing of tuberculosis difficult because of the peculiar pathological features of the specifically involved tissue, but also because of the manner in which the disease effects the other organs and systems of the body. And here again the difficulties increase with the advancement of the process. While the nervous, circulatory, digestive and muscular systems, as well as all organs of the body, are influenced early in the disease, later they take upon themselves a serious derangement.

As the extent of the lesion increases and more and more of the pulmonary tissue becomes involved, the blood is oxygenated with greater difficulty, and as a result all the tissues of the body suffer a deterioration which counts greatly against the patient in fighting the disease.

Another factor in the deterioration of tissue and the impairment of functions of the various organs is the toxins which are given off from the tubercles. These are not all due to the bacillary process in itself. The bacillary toxins are important, but added to them we have the toxins which result from the disintegration of the tuberculous tissue, and those which result now and then when other bacteria complicate the process. The rôle supposed to be played by mixed infection seems to be gradually lessening, and we now look upon toxemia, from the first two sources mentioned, as being the one which must be considered in every case which has advanced beyond the earliest stages.

The heart has a peculiarly difficult rôle in advanced tuberculosis. In the first place, it is called upon to do extra duty. It is obliged to force the blood through the more or less diminished pulmonary areas and at the same time is reduced in its ability to perform work. It suffers from the general disturbance in oxygenation, and its muscle is weakened by the toxins; its nerve supply is also influenced by these same factors and shows the same peculiar irritability that marks the nervous system in general in this disease. Added to this are the compensatory changes which occur between the two lungs as a result of the contraction of the areas most severely diseased, and the enlargement of the portions which are comparatively healthy. The mediastinum is displaced, the heart draws over to the side of greatest contraction unless it is bound down by adhesions, and in either case it is forced to work at a great disadvantage. In spite of this and in spite of the abuse to which this organ is usually put through over-exertion by the average advanced tuberculous patient, the heart usually bears up well. It must be understood, however, that the heart in advanced tuberculosis is usually working on its reserve power; hence, it should be especially favored until it has become fully adjusted to the new conditions surrounding it.

The disturbances on the part of the digestive system are extremely interesting. They are very complex from the standpoint of causation, and in their severest phases are exceedingly difficult to overcome. The secretory, motor and absorptive functions of the digestive tract, as well as the further elaboration and final assimilation of the digested food, are all deleteriously influenced.

In small lesions the amount of disturbance is slight, but in advanced cases we find among others the following factors each contributing something toward the prevention of a normal harmonious action: The effect of deficient oxygenation; the effects of the various toxins upon secretion and motility; the reflex stimulation of the vagus due to the fact that the respiratory ends of the vagus are irritated by the inflammation in the lung; the disturbance of function due to the disturbance in the action of the diaphragm; and the effect produced by the lack of cell tone and general muscle waste.

The nervous system is profoundly influenced both through the general toxemia and the general cell disturbance which affects all organs. Aside from this there is a direct influence on all nerves which come in direct connection with the nerves which supply the inflamed lung, producing such symptoms as hoarseness through the recurrent laryngeal, digestive disturbances through the stomachic portions of the vagus, and the disturbance of the heart through the cardiac portion of the same nerve. Then there is another phase of disturbance which is shown reflexly in those nerves which take their origin from the same segments of the cord that receive impulses from the sympathetics supplying the lung. The changes in these nerves sometimes amount to a true neuritis; and

the effects are shown in sensory, motor and trophic changes in the parts supplied by them.

The muscular system suffers as a result of deficient oxygenation, also from toxemia and as a result of the disturbance of the nerve supplying them. All the important organs of the body are likewise disturbed in their function.

With the above picture of advanced tuberculosis before us we might be inclined to think that the prognosis is universally bad, but such is not the truth. While, of course, these cases are difficult and throw many obstacles in the way of cure, at the same time it is remarkable to see what can be done even in these advanced cases with patience and perseverance. Unless the patient is in extremis there are often chances of arrestment. If he cannot obtain a healing he may be freed from annoying symptoms and be allowed to live anywhere from many months to many years. Whether or not this will occur depends largely upon the intelligence of the treatment and the co-operation of the patient.

It is in the treatment of advanced tuberculosis that the physician's ingenuity is taxed to its limit and the patient's co-operation is put to the severest test. With the heart, the digestive system, the nervous system, and, in fact, with the entire body burdened as the writer has already mentioned, the problem is far from an easy one; nevertheless, the reactive force of the human economy is such that it often comes to the rescue of these patients even after the body has been severely taxed.

It is not sufficient to apply correct treatment only, but it must be applied under ideal conditions. If there is any form of tuberculosis that should be treated in institutions, it is the advanced form. These patients, for the most part, become more or less neurasthenic. They are inclined to be irritable at times; they have all kinds of complications, first on the part of one organ and then on the part of another. To handle these successfully, half the battle has been won when the patient is taken away from his home and surrounded by trained attendants. The treatment in advanced tuberculosis consists in creating an atmosphere of hope and optimism; surrounding the patient with a spirit of cheerfulness and determination to get well; putting him in such a frame of mind that he will co-operate freely and do the things that are essential to cure. This psychic effect is seen in all instances in which patients are put under treatment in which they have confidence. It is a rule, for patients entering a sanatorium, to sleep well, although previously they had been spending restless nights; to have better appetites; to become less nervous and take upon themselves a feeling of well-being which they had not previously experienced. This comes before there has been any opportunity for the treatment to do good, and is simply the result of a better mental state. This is the same thing that the newspapers have reported in nearly all instances where the Friedmann vaccine was used. Such announcements do not mean much to the physician who is ac-

customed to treating these patients, because he sees it constantly. The improvement of the pathological condition is a much slower process and requires not hours, but weeks and months, and oftentimes years for its completion.

The second factor in the treatment of tuberculosis is a careful regime suited to the individual and carried out for a long time. What the writer means by careful regime is not a routine method of treatment, but a method of treatment devised after the patient has been carefully examined and after all the various factors that are contributing to his physical deterioration have been studied.

It must also be borne in mind that tuberculosis is a chronic disease. The changes which take place, whether the patient goes on to a cure, or whether he goes down to dissolution, are slow. Failure often comes from giving up too soon. There is no necessity for giving a hopeless prognosis and ceasing our endeavors on behalf of the patient, so long as he is able to digest and to assimilate food and so long as the heart is capable of performing its functions. The writer has seen patients, after running a prolonged temperature for many months, finally reach normal after the diseased tissue had been destroyed and cast off, and then regain their strength and weight and go on to a degree of health that seemed impossible. To obtain such results has often taken many months, but the time expended was well worth it. The writer remembers several instances in which, had treatment been interrupted at the end of nine months, or a year, he would have failed; but, by keeping up the treatment, at the end of two years the patient had an arrested condition and a renewed lease on life.

In the treatment of these advanced cases, aside from the optimistic suggestion, the writer would urge two lines of therapy. These patients should be in the open air. Every organ and system of the body should be studied carefully. The heart, the alimentary tract, the respiratory passages, the nervous system should all be looked into carefully, and wherever there are difficulties they should be corrected if possible. Good food should be supplied and a most careful hygienic regime instituted. These factors act directly upon the patient. They increase the activity of his cells; they enable him to respond better in providing a proper defense. Aside from these measures, specific bacillary products should be employed. The injection of tuberculin is not treating tuberculosis. Tuberculin acts only on the tuberculous process and affects the general well-being of the patient indirectly; general hygienic and tonic measures and those which improve the mental condition of the patient, on the other hand, affect every organ and function of the body and act upon the tuberculous process indirectly. The two are supplementary and both essential to best results. While there is serious objection to inexperienced men treating these advanced tuberculous patients with tuberculin, yet the writer is sure that those who have had experience in the use of tuberculin and in

the treatment of tuberculosis should be able to use this remedy to their great benefit.

The treatment of the advanced tuberculous case with the expectation of producing a good result is a very difficult problem. It is a problem, not for the general man, but for the specialist in tuberculosis; but the writer desires to make it clear that even advanced tuberculosis is not beyond hope. Practitioners in other fields do not give up a patient because he is seriously ill. Called to a case of typhoid fever when the patient is extremely low, the efforts are doubled so that a cure may be brought about. When a surgeon performs a serious operation he uses greater caution than he would if it were a simple case; so must it be in the treatment of advanced tuberculosis. The difference here lies in the fact that tuberculosis is a chronic disease; the effort must not be made for a day, for a week, or for a month, but for many months and sometimes years.

THE TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM.*

By FRANK R. FRY, M. D., of St. Louis.

The extensive employment of intramuscular injections of mercury within the last few years has been truly instructive. In fact, it marks an epoch in the matter of dosage. Although it is true that a few individuals here and there had been using inunctions with sufficient system and boldness in some of the manifestations of lues, other forms of the disease were comparatively neglected, notably the later manifestations in the nervous system; and we all know how extensively the intramuscular method has been used in the latter conditions and the remarkable results thus obtained. It is largely on account of these results that a new impetus was given to mercurial treatment in all forms of the disease.

And yet, even with this refinement, we are still without a gauge for dosage. For example, suppose we have treated a patient for several years and given several hundred doses of mercury in approved fashion, how are we to decide when there has been a sufficiency? Certainly not by the absence of clinical manifestations nor by the showings of the Wassermann test. In fact, we have no test. Meantime, what? I would answer as I repeatedly have before: Give mercury in every instance as long as you can and as much as you can *conscientiously*. Let us emphasize this advice by taking it literally. Our syphilitic patients are notoriously inconstant. Only a small proportion of them hold on as we try to advise them. We find only few instances of actually satisfactory trials of treatment. But when we do have them adhering to us for five, ten, fifteen, or twenty years, we should honor their constancy by continuing to treat them faithfully. For many years past there has been a growing conviction among those whose opportunities for observation have been the largest, that this infection is of a nature to require a constant attack with such remedies as we possess. The wisdom of this deduction is vividly attested by the very latest achievement in syphilitic pathology. I refer to the brilliant demonstration by Noguchi, of the Rockefeller Institute, within the last few weeks, of the presence of the syphilitic spirochætae in large numbers in the brains of paretics, where the infection has undoubtedly been of many years' duration.

The insistent and troublesome question of dosage is constantly propounded in some such fashion as this: How shall mercury be given? How much? How often? In order to be as direct and brief as possible I would answer: Use intramuscular injections always if practicable, at

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least for a part of the time. The only substitute which approaches them is inunction of the drug properly done—with the emphasis on the word 'properly.' In attempting to use either of these methods there is no longer excuse for anything short of an irreproachable technique. Mercury by the mouth for syphilis is comparatively a makeshift at best. We should feel the force of this fact when impelled through tradition or other considerations to give it in this way. Next, how much should be given, and how often? The frequency, of course, depends on the size of the dose and the character of the preparation used. We are now admonished on all sides that the old ideas of stipulated periods of remission or rest in the administration no longer hold. For example, Pederson states that one month out of twelve is long enough to stop. In attempting to regulate this detail I know of only one suggestion—the one already made—to give all we can conscientiously; to acquaint ourselves conscientiously with the condition of every patient to whom we would attempt to administer the drug; to maintain conscientiously this acquaintance as we proceed; and to study conscientiously the effect of practically every dose. How otherwise are we to form any idea of how much we may give? I have seen an initial intramuscular dose of $\frac{1}{4}$ grain of the salicylate produce stomatitis and frequent bloody stools. On the other hand, a grain given in the same manner and frequently repeated may cause no disturbance. We have all long ago forsaken the old crudity of 'touching up the gums.' Instead, we try to avoid it by taking excellent care of the mouth. In this we very often succeed in spite of large doses. On the other hand, we may occasionally proceed with large doses for a long time despite the constant presence of a slight 'touching of the gums.'

For some time past I have been noticing a condition which, for want of a more expressive designation, I have spoken of as mercurial sensitization. Occasionally in giving an intramuscular dose to a patient, who has been getting mercury regularly, there follows a reaction not unlike the anaphylactic reaction to certain serums. This may amount to a decided chill and fever, some nausea and headache, and a great deal of general aching. Usually it is much lighter than this, amounting only to some chilliness and slight malaise for a few hours. It has occurred quite a number of times, and repeatedly in physicians who were my patients and who were interested in watching the reaction in themselves. When I first began to notice it I thought it was probably due to a strong local reaction at the site of injection, or possibly due to embolism, which not infrequently occurs when oily injections are given. I am now quite satisfied that it is not of this origin, but that it occurs when there has been produced in the patient a certain sensitization to the drug, and that it is probably different from the ordinary toxicity evidenced in the salivary glands and the intestinal tract. I have made some practical use of it in that I stop the administration when the patient makes the first or second announcement of the reaction. I have seen it a number of times follow three successive

injections in a patient at intervals of a few days. In observing this phenomenon it has seemed to me not improbable that we may finally find in this, or some similar indication, a more convenient and reliable guide to dosage than we now possess.

Salvarsan certainly does some wonderful things to the spirochætæ of syphilis, and this is almost all we know therapeutically concerning it. While we are still acclaiming it a wonderful drug and a wonderful remedy, we are beginning to realize that it will be many years before we may properly estimate it. Meantime, however, we will continue to use it, and, from present indications, in large quantities. For example, I know patients who have had ten and twelve large doses, and no one can answer the question why they have not had more. In these instances, at least, it was not a question of price.

We are not prepared in the case of salvarsan, as in the use of mercury, to advise to give all we can, even with the proviso *conscientiously* appended. We need more time to mold our conscience to the scientific as well as to the financial side of the situation. With the increasing use of the drug contraindications do not seem to multiply. This fact has emboldened many to proceed with no set limit that has yet appeared. We were at first cautioned to avoid salvarsan in optic nerve degeneration, in nephritis and in cardiac disease. These precautions are now largely neglected. We are told that syphilitic nephritis and myocarditis have been cured by it in a wonderful fashion, and that it is of greater value in optic nerve atrophy than the old method of mercury and strychnine. Notwithstanding that the race is just now being salvarsanized in large numbers, we must still wait (Pederson says for twenty years) for the final verdict.

Among the most interesting and perhaps most instructive phenomena resulting from the use of salvarsan are the so-called neuro-lapses, *i. e.*, the relapses in nerve lesions, which are sometimes very serious, especially in the case of cranial nerves. In their resistance to repeated treatment either with salvarsan or mercury, these lapsing nerve lesions are quite similar to certain peculiar cutaneous lapses, as reported by Bettman and others.

In the discussion of these relapsing phenomena, some suggestive questions have been raised. It seems evident that they are not due to the direct or chemical effect of salvarsan. It is more probable that they are due to a change in the character or in the strain of the spirochætæ; a strain that may have a greater affinity for nerve tissue, for example, and at the same time a greater resistance to salvarsan and mercury. Logically, there follows the farther speculation whether salvarsan may not, at least, in some subjects, interrupt Nature's attempt at immunity; or, in other words, cripple organisms which are furnishing the most reliable grade of antibodies. This, it is true, is only food for thought, but per-

haps it would be a good idea to partake of a little of it when we find ourselves inclined to get very bold in the use of salvarsan.

There seems to be no valid reason why mercury and salvarsan should not be used in combination. On the contrary, there seems to be good reason for combining them properly in treatment. It is not meant by this to administer them together, but to alternate them with some kind of system. Unfortunately, we cannot as yet all adopt the same system. Some of us would use mercury actively and as a matter of conscience interpose here and there a few doses of salvarsan, not wishing to assume the responsibility of depriving our patients of any additional chances that salvarsan might give to them. On the other hand, are those who are pinning their faith to salvarsan and giving some mercury on the side, as it were, merely doing this for conscience sake?

A good many fatalities have resulted from administering full doses of salvarsan to patients with extensive or intense lesions of the central nervous system, especially of the brain. Before giving salvarsan in cases of this kind, and also in case of focal nerve lesions, it is advised to give mercury, or mercury and iodide, until the patient is much improved.

Another interesting consideration may be cited in connection with the foregoing statement—namely, that by giving mercury we may provoke a positive Wassermann reaction at times in patients who had previously only shown a negative reaction. It is also now a well-known fact that we often get a positive Wassermann reaction from the cerebrospinal fluid when it cannot be obtained in the blood. These facts carry suggestions which cannot be included in a paper of limited length.

I have already alluded to the remarkable results that have followed intramuscular injection of mercury in the later forms of lues in the central nervous system. In our enthusiasm over salvarsan we have been almost losing sight of these results. They taught us an important lesson—namely, that we had been too confident in our ability to differentiate clinically between syphilis and so-called parasyphilis of the nervous system. The conception of paresis and tabes as very definite post-syphilitic entities, clinically and pathologically, has been for some years undergoing notable modification. And now comes Noguchi's discovery of the actual presence of the syphilitic organisms in the brains of paretics, making more pertinent than ever the questions: What is paresis and what is tabes? and when and how is our treatment going to prevent them?

For many years the edict has been forming to use iodide in syphilitic arethritis and in gummatous formations. The experience of many of us has seemed to confirm the advantages of following this advice. The recent investigations of Wechselsmann and others are to the effect that the spirochæta find their most impregnable strongholds in these pathological formations and that the iodide is of distinct value in leading the way for salvarsan and mercury. Here again we note, as we have already stated, how frequently the recent scientific discoveries in syphilitic disease have been

foreshadowed by opinions which had their foundation in careful clinical study. This should admonish us not to lose interest in the clinical side of this great study, in view of the wonderful and brilliant scientific revelations of the last few years. Notwithstanding the discovery of the pathogenic organism of lues, the Wassermann reaction, and Ehrlich's sensational remedy, we have still much to learn and must still wait patiently for the kind of knowledge that shall force a greater unanimity of opinion and consequently a more comfortable uniformity in practice.

MEDICAL AND SURGICAL PROGRESS.

THE TREATMENT OF CHRONIC ARTHRITIS.

A REVIEW OF RECENT LITERATURE.

By WM. ENGELBACH, M. D., of the Editorial Staff.

1. Armstrong: Radium Water, and Radio-Oxygen Therapy in Rheumatism. (*Practitioner*, Vol. 88, pp. 156-160, 1912.)
2. Axhausen: Deforming Arthritis, Result of Necrosis of Cartilage. (*Berl. klin. Wochenschr.*, Vol. L, No. 7, February 17th, 1913.)
3. Baglioni: Acute Articular Rheumatism Consecutive to Pseudomembranous Pharyngitis. (*Gazz. degli Osped. e delle Cliniche*, Milan, No. 49, pp. 511-518, April 24th, 1913.)
4. Barker: Septic Infection of Joints. (*Practitioner*, p. 381, February, 1913.)
5. Barr: Rheumatoid Arthritis (*British Med. Journ.*, Vol. I, No. 2728, April 12th, 1913.)
6. Billings: Chronic Focal Infections and Their Etiological Relations to Arthritis and Nephritis. (*Illinois Med. Journ.*, March, 1912); Symposium on Focal Infections: Their Relation to Diseases of Heart, Kidney and Joints. (*Journ. Amer. Med. Assoc.*, p. 2169, December 30th, 1911.)
7. Bolling: Rheumatism and Its Kind; Classification and Diagnosis. (*Indiana State Med. Assoc. Journ.*, No. 5, May 6th, 1913.)
8. Capps: The Role of Milk in the Causation of the Chicago Epidemic of Sore Throat. (*Journ. Amer. Med. Assoc.*, p. 1715, November 9th, 1912.)
9. Capps and Miller: The Chicago Epidemic of Streptococcus Sore Throat and Its Relation to the Milk-Supply. (*Journ. Amer. Med. Assoc.*, p. 1852, June 15th, 1912.)
10. Crowe: Etiology of Rheumatoid Arthritis. (*Lancet*, Vol. I, No. 4681, May 17th, 1913.)
11. Dardel: Gonorrheal Arthritis in Arthritic Subjects. (*Medical Record*, Vol. LXXXIII, No. 4, January 25th, 1913.)
12. Davis and Rosenow: An Epidemic of Sore Throat Due to a Peculiar Streptococcus. (*Journ. Amer. Med. Assoc.*, p. 773, March 16th, 1912.)
13. Davis: Bacteriologic Study of Streptococci in Milk in Relation to Epidemic Sore Throat. (*Journ. Amer. Med. Assoc.*, p. 1852, June 15th, 1912.)
14. Duncan: Autotherapy (Sputum Filtrate) in Acute Articular Rheumatism; Report of Case. (*Boston Med. and Surg. Journ.*, Vol. CLXVIII, No. 10, March 6th, 1913.)

15. Editorials: Milk-Borne Tonsillitis. (*Journ. Amer. Med. Assoc.*, p. 1618, November 11th, 1911; p. 51, January 4th, 1913; p. 894, November 23rd, 1912). Autogenous Vaccine Therapy in Epidemic of Tonsillitis and Acute Arthritis. (*Journ. Amer. Med. Assoc.*, Vol. LX, No. 23, p. 1813, June 7th, 1913.)
16. Engelbach and Horwitz: The Diagnosis of Chronic Rheumatism. (*Medical Herald*, No. 8, p. 285, August, 1913.)
17. Goadby: The Relation of Diseases of the Mouth to Rheumatism. (*Practitioner*, Vol. 88, pp. 107-119, 1912.)
18. Griffiths: Tuberculous Rheumatism. (*Austral. Med. Gaz.*, Vol. XXXII, No. 24, December 14th, 1912.)
19. Gudzent: Radium Emanations in Treatment of Arthritis and Gout. (*Berl. klin. Wochenschr.*, November 20th, 1911.)
20. Hamburger: Baltimore Epidemic of Streptococci or Septic Sore Throat and Its Relation to Milk-Supply. (*Bull. Johns Hopkins Hospital*, January, 1913.)
21. Hamburger: An Epidemic of Septic Sore Throat in Baltimore and Its Relation to a Milk-Supply. (*Journ. Amer. Med. Assoc.*, p. 1109, April 13th, 1912.)
22. Handley and Ball: Cheilotomy; Function-Restoring Operation in Crippling Traumatic Arthritis of Hip-Joint. (*British Med. Journ.*, Vol. I, No. 2731, May 3rd, 1913.)
23. Hastings: Complement-Fixation Tests for Streptococcus, Gonococcus and Other Bacteria in Infective Deforming Arthritis and Arthritis Deformans. (*Journ. Amer. Med. Assoc.*, April 19th, 1913.)
24. Heinemann: The Epidemic of Sore Throat in Chicago. (*Journ. Amer. Med. Assoc.*, p. 716, August 31st, 1913.)
25. Herrick: Symposium on Focal Infection. (*Journ. Amer. Med. Assoc.*, p. 2170, December 30th, 1911.)
26. Hess: Importance of Tonsil Region in Relation to Acute Articular Rheumatism and Heart Disease. (*Med. Klin.*, November 21st, 1910.)
27. Higgs: Relation Between Diseased Tonsils, Rheumatic Fever and Heart Disease. (*Northwest. Med. Journ.*, November, 1911.)
28. Hillebrecht: Nodose Rheumatism. (*Med. Klin.*, Vol. IX, No. 6, February 9th, 1913.)
29. His: Treatment of Gout and Rheumatism by Radium. (*British Med. Journ.*, February 4th, 1911.)
30. His: Radium in Gout and Rheumatism. (*Berl. klin. Wochenschr.* January 30th, 1911.)
31. Hughes: Autogenous Vaccines in the Treatment of Chronic Joint Affections; Rheumatoid Arthritis and Gonorrheal Arthritis. (*British Med. Journ.*, pp. 1267-1268, June 14th, 1913.)
32. Jackson: Experimental Streptococcal Arthritis in Rabbits. (*Journ. Infect. Dis.*, Vol. XII, No. 3, May, 1913.)
33. Jackson: The Treatment of Rheumatism by Injection of Magnesium Sulphate. (*Practitioner*, Vol. 88, pp. 177-179, 1912.)
34. Jacobsohn: Deforming Arthritis. (*Mitteilungen aus den Grenzgebieten der Med. und Chir.*, Vol. XXV, No. 4.)
35. Jones: Chronic Arthritis; Therapeutic Evidence of Incidence of Streptococcal Infection. (*British Med. Journ.*, Vol. I, No. 2733, May 17th, 1913.)
36. Kemen: Radium Therapy of Chronic Articular Rheumatism, Gout and Sciatica. (*Petersburg med. Zeitschr.*, February 28th, 1912.)

37. Lasserre: Antimeningococcus Serotherapy of Gonorrheal Arthritis. (*Journ. de Médecine de Bordeaux*, Vol. XLIII, No. 19, May 11th, 1913.)
38. Lambert: Study of Special Diseases. (*British Med. Journ.*, p. 2739, May 17th, 1913.)
39. Latham: Pathology and Treatment of Rheumatoid Arthritis. (*Practitioner*, p. 47, January, 1912.)
40. Leutscher: Bacteriology of Epidemic Sore Throat. (*Journ. Amer. Med. Assoc.*, p. 869, September 14th, 1912.)
41. Lindsay: Rheumatoid Arthritis in Children. (*Edinburgh Med. Journ.*, p. 332, April, 1913.)
42. Llewellyn: Types of Rheumatoid Arthritis with Suggestions as to Thyroid Treatment. (*Edinburgh Med. Journ.*, p. 286, March 10th, 1904.)
43. Luff: The Diagnosis and Treatment of Rheumatoid Arthritis and Other Forms of Infective Arthritis. (*Practitioner*, pp. 22-33, January, 1912.)
44. Macalister: Rheumatoid Arthritis and Its Relation to Other Diseases. (*Med., Surg. and Path. Reports of the Royal Southern Hospital*, 1902.)
45. Marshall: A Collection of Facts, Ideas and Theories Relating to the Diverse Elements that Contribute to Success in Treatment of Joint Diseases. Relationships Between Visceral Ptosis and Arthritis. Comparisons Between Mild Intestinal Toxemias and Gout. (*Boston Med. and Surg. Journ.*, Nos. 10, 11 and 12, March 6th, 13th and 20th, 1913.)
46. McKinney: Streptococcus Infections of Throat. (*Southern Med. Journ.*, June, 1912.)
47. Midelton: The Administration of Thyroid Extract in Rheumatoid Arthritis. (*Practitioner*, Vol. 88, pp. 180-184, January, 1912.)
48. Murrell: Gonorrheal Rheumatism. (*Practitioner*, pp. 34-45, January, 1912.)
49. Osgood: Certain Types of Arthritis Deformans and Their Management. (*Journ. Amer. Med. Assoc.*, No. 9, p. 858, 1912.)
50. Pickenbach: Importance of Tonsillitis in Etiology of Acute Rheumatism. (*Muench. med. Wochenschr.*, April 5th, 1910.)
51. Poncet: Chronic Arthritis and Tuberculous Rheumatism. (*La Presse Médicale*, No. 26, March 29th, 1913.)
52. Ridlong: Symposium on Focal Infections, etc. (*Journ. Amer. Med. Assoc.*, p. 2170, December 30th, 1911.)
53. Rosenow: Study of Streptococci from Milk and from Epidemic Sore Throat and the Effect of Milk on Streptococci. (*Journ. Infect. Dis.*, November, 1912.)
54. Schichhold: Tonsillectomy in Treatment of Rheumatism and Other Infections. (*Muench. med. Wochenschr.*, February 8th, 1910.)
55. Senator: The Nose as Source of Infection in Chorea and Acute Rheumatism. (*Deut. med. Wochenschr.*, Vol. XXXIX, No. 19, May 8th, 1913.)
56. Sippy: Symposium: Focal Infections. (*Journ. Amer. Med. Assoc.*, p. 2170, December 30th, 1911.)
57. Soltau: Use of Vaccines in Treatment of Rheumatoid Arthritis. (*Journ. de Méd. de Bordeaux*, Vol. XLIII, No. 19, May 11th, 1913.)
58. Stockman: Drugs in Rheumatic Conditions. (*Practitioner*, Vol. 88, pp. 61-66, 1912.)

59. Stowell and Hilliard: Comparison of Streptococci from Milk and from Human Throat. (*Amer. Journ. Dis. Children*, May, 1912.)
60. Stowell, Hilliard and Schlesinger: Statistical Study of Streptococci from Milk and from Human Throat. (*Journ. Infect. Dis.*, March, 1913.)
61. Thomson: Rheumatoid Arthritis. (*British Med. Journ.*, Vol. I, No. 2728, April 12th, 1913.)
62. Timmins: Ionization and Bier's Hyperemia in the Treatment of Rheumatism: (*Practitioner*, Vol. 88, pp. 336-340, 1912.)
63. Vetlesen: Tonsillitis as Factor in Acute Rheumatism. (*Norsk Magazin for Laegevidenskaben*, Christiana, Vol. LXXIV, No. 4, April, 1913.)
64. Wheeler: Cheilotomy for Crippling Traumatic Arthritis of Hip-Joint. (*British Med. Journ.*, Vol. I, No. 2732, May 10th, 1913.)
65. Williams: Some Further Aspects of Obesity. (*Practitioner*, April, 1911.)

Chronic diseases of the joints have always been a bugbear to the general practitioner. The many different classifications dependent upon the differences of opinion regarding their etiology and pathology have necessarily made their diagnosis and treatment very indefinite and uncertain. Until recently the local pathological changes presented in the joints received the greatest attention and were considered the bases for diagnosis and treatment. During the past year theories of these diseases have changed so decidedly as to clarify considerably the entire subject of joint diseases. The most important development with regard to their treatment has been the tendency to prove that the changes in a joint, whatever its character, is only a sign of some disease or condition elsewhere in the body. Investigations have been directed away from the joint to discover lesions or diseases with which the joint diseases were associated. The treatment directed towards this remote etiology has had such a surprising influence upon clearing up the changes in the joints that it has gone far to prove the relationship between the diseased joint and focal or systemic diseases.

Besides this clinical evidence there has been in the last six months considerable experimental work done to prove definitely that focal or general diseases actually are the underlying causes of these chronic joint changes. Bacteria, isolated from the gums, the sinuses, tonsils, etc., have, according to the report of different investigators, by inoculations produced changes similar to those found in arthritis deformans and other chronic joint diseases. In those cases in which no other focal or general disease was demonstrable in the individual, complement-fixation test of the blood was made by some authors to determine the organism which was or had originally been the cause of the chronic joint lesion. Vaccines then made of this organism when given in these particular cases have produced beneficial effects upon the chronic disease of the joints.

With this understanding of the pathogenesis of chronic joint diseases as a basis, the treatment of the chronic arthritis has been directed away from the joint towards some focal or systemic conditions, or to the causo-bacteria, whether found in a lesion, in the blood, or identified by complement-fixation test. The important lesson to learn from this work is first to ascertain, in the individual suffering from chronic joint changes, some focal or general disease or condition; and after such disease is found, to direct treatment towards its removal. If autogenous vaccines

can be made from discharges or local tissue lesion, or from bacteria identified by complement-fixation test, their exhibition is indicated. This new treatment has produced such good results, and is apparently fixed upon such a reasonable and scientific groundwork that there is no doubt but what its further evolution and study will be of great value in the diagnosis and treatment of chronic arthritis.

This review embodies these newer ideas of treatment which have appeared in the literature during the past year; in fact, with few exceptions during the last six months. There are also abstracts of late articles bearing upon the symptomatic, local, radium, organotherapy, and surgical treatment of chronic diseases of the joints.

Billings states that chronic focal infections due to a former acute local infection elsewhere in the body are far more frequent than is generally supposed. The lymphoid tissue of the mouth, nose and pharynx is often the seat of such an infection, and frequently may be shown to explain the existence of other infections, such as acute rheumatic fever, infective chorea in the earlier periods of life, endocarditis, arthritis, and nephritis later in life. An infection may lie latent in the tonsil for years. Disease of the gums, teeth and alveolar sockets may cause systemic disease, likewise disease of the accessory sinuses of the nose and head. Bronchiectasis, and other chronic local infections of the lungs, gastro-intestinal disturbances, chronic appendicitis, cholecystitis, and cholangitis, chronic disease of the pelvis of the kidney, bladder and prostate, the female genital tract, and local septic submucous and subcutaneous foci anywhere in the body may be the source of systemic disease. Chronic arthritis is one of the most common results of such infection, also nephritis, acute and chronic cardiovascular degeneration, chronic neuritis and myalgia. Such patients should always be examined carefully and search made for some latent or chronic focal infection. When such a focus has been located and seems rationally related to the systemic infection, it should be removed, if possible. If the tonsils are the offenders, they should be removed thoroughly, enucleated but not mutilated, so that no tonsil tissue is left behind. Adhesions between the tonsils and the pillars of the fauces frequently wall in foci of infection in the peritonsillar tissues; spaces in the gums between the roots of the teeth are also favorable seats for focal infections. Cultures and careful pathological examinations of focal lesions should be made.

More than thirty patients, he stated, had been under close observation, in whom the original focus of infection appeared to be the tonsillar tissue. These patients suffered from nephritis, neuritis and arthritis deformans. The result of the treatment was in the majority of cases beneficial. In 2 cases of well-advanced chronic arthritis deformans, the patients were not much benefited. These cases showed conclusively that any or all these chronic conditions may be the result of an unrecognized focal infection to which attention was not attracted because of the absence of symptoms pointing in that direction. Many persons suffer from chronic tonsil disease, sinusitis and other similar conditions for years without having their attention called to the ailment in a way which would lead them to consult a physician. There was no doubt that insidious degenerative processes do occur in persons well along in years which are caused by slow intoxications from chronic focal infections variously located. The result of the removal of these infections is astonishing. There seems no better reason for the prevalence of rheumatic fever or endocarditis in children than the frequency of focal infec-

tions in the throat and nose. So far the experimental work he has done has confirmed what he said with reference to the relationship existing between these unrecognized focal infections and systemic disease.

According to Herrick, it is important to study the tonsils of children who have endocarditis. If they are removed, some of the acute exacerbations and some of the serious and malignant forms of endocarditis may be avoided. Pelvic inflammations of women are apt to be a cause of cardiac disease. He thought that some of the cases of mitral stenosis, so frequent in women, were due to a long-standing pelvic inflammation. While the close relationship between acute focal inflammation and more distant systemic infections was known, the importance of chronic focal infections has not been recognized. The latter were latent and did not, by pain, swelling or other evidence of inflammation, give proof of their existence, and yet they often cause a systemic disturbance. The tonsils were not always enlarged, and they did not give evidence of trouble. The same was true of the gall-bladder. The prostate might harbor the gonococcus and give rise to future focal symptoms, but search for slight evidence of local trouble must be made to explain some of these otherwise inexplicable cases of arthritis. It should be only after most careful study of the individual case, however, that any surgical intervention should be recommended. In the experimental work reported by Davis, the result was always an acute spasm or an acute suppurative arthritis, or other acute condition; and yet in the cases reported by Billings the process was always a chronic one.

Sippy reported 2 cases of joint inflammation associated with pyorrhea alveolaris. In neither case was it possible to isolate the germ from the blood. A third case, diagnosed as tuberculosis, cleared up very rapidly after cleansing the teeth and draining an alveolar abscess. The tonsil was not necessarily always seriously involved. In one case of general spasm resulting in death—the most acute sepsis he ever saw—the cause was a trivial sore throat. At the post-mortem an abscess was found at the base of the tonsil.

Ridlong reported one case in which a multiple hypertrophic osteo-arthritis of ten years' duration was due to disease of the teeth and an alveolar abscess. One case of stiff back, diagnosed as tuberculosis, was cured in three days by the removal of a tonsil which contained an abscess as big as a hickory nut. Another case of stiff back, diagnosed as tuberculosis by an eminent physician, was found to be due to a gonorrhea contracted twenty-five years before. An osteo-arthritis could exist and show no evidence in the x-ray picture for many months. He thinks it is necessary that we should be a little sharper and clearer in our differential diagnosis between osteo-arthritis and tuberculosis in children, because children do have osteo-arthritis which simulates tuberculosis very closely.

Chronic diseases of the joints are classed in the article of Engelbach and Horwitz as due to one of the following causes: (1) Focal infection, (2) disturbance of internal secretion, (3) general or systemic infections, (4) trophic nervous changes. Proof of such cause is shown by marked improvement or cure of the joint disease in detailed cases by treatment of the associated lesion or condition. Without going into detail upon each specific cause, they gave a summary of cases illustrating the relationship of these various chronic joint diseases to some focal or general disturbance which came under their personal observation. They emphasize the importance of searching for disease in other parts of the body as an aid to diagnosis of chronic joint conditions.

The focal infections which they found responsible for the production of chronic joint involvement were: (1) Sinusitis, (2) otitis media or interna, (3) tonsillitis, (4) diseases of the gums and teeth, (5) prostatitis and urethritis, (6) seminal vesiculitis, (7) salpingitis, (8) cystitis, (9) pyelitis, (10) cholecystitis, (11) disease of the large intestine: dysentery (amebic and bacillary) and intestinal stasis, (12) disease of the lungs: bronchiectasis and tuberculosis. The internal secretions held responsible for joint involvement were abnormal secretions of the thyroid, thymus, ovaries, pituitary body, testes. The general or systemic diseases given were gout, scurvy, rachitis, lues (hereditary and secondary), rheumatica poliosis, rheumatica hemorrhagica, erythema (nodosa and multiforma), typhoid, tuberculosis (usually of the spine), etc. Typical illustrations of trophic joint diseases are those of syringomelia and tabes.

They concluded as follows: (1) Chronic disease of the joints should be considered a sign of some focal or systemic disease elsewhere in the body; (2) the diagnosis of chronic disease of the joints depends upon establishing interrelationship between the focal or systemic disease and the changes in the joints; (3) in those cases observed by the authors treatment directed toward these focal or systemic causes produced the best results upon the joint lesions.

Poncet continues his arguments on the tuberculous nature of chronic arthritis in a large proportion of cases. The discovery of a tuberculous process elsewhere or the development of one shortly afterward confirms the tuberculous origin of the joint process. In many cases he was at a loss to confirm the tuberculous nature of the joint trouble until a few months after, when the tuberculosis pulled off its mask and supplied the proof which he had been vainly seeking before; for example, a case of arthritis of the elbow with ankylosis finally healed, but three months afterward tuberculous pleurisy developed. The practical import of his arguments is that it is safer to treat a chronic joint affection as if it was positively known to be of a tuberculous nature; such patients should be treated as for tuberculosis and not for the gouty tendency or the arthritic diathesis. They should be encouraged to eat heartily and live out-of-doors. Cod liver oil should alternate with arsenic, phosphates and iodides, and he insists that patients with tuberculous rheumatism should keep up this line of treatment all their life; just as syphilitics should return to specific treatment from time to time. Local treatment should not be omitted, and the most effective is exposure to the direct rays of the sun. For twenty years he has been teaching—"The sun is the most effective agent for revulsion and sedation"; and he has found that very few patients fail to benefit by the heliotherapy. As a rule, patients with inflammatory tuberculosis have a peculiar plasticity of the tissues which permits unusually fine results from operative measures. Although the processes may heal spontaneously and especially under heliotherapy, yet operative treatment may be necessary in case of ankylosis. Resection with early mobilization gives brilliant and durable results.

Hastings, in a very enlightening report on the identification of the bacterial cause of arthritis deformans by means of complement-fixation tests, advances that the proof of infection may be searched for by making the following tests: (1) Cultures of exudates from the joints and tissues about the joints; (2) cultures from possible foci other than the joints (as evidenced by clinical manifestations); (3) blood-cultures for a bacteremia; (4) blood tests for immune bodies, of which the complement-fixation test against autogenous antigens (obtained by the three pre-

ceding methods), and against exogenous antigens, is the most appropriate. The first method is the only one which will prove absolutely that the joints and neighboring tissues have been invaded by bacteria. The second and third methods show an infection of the body with bacteria; and from this fact it is sometimes concluded, as with infective endocarditis ('malignant' and 'ulcerative' endocarditis) that the bacteria isolated by the second and third methods are the cause of a local infection of which the focus cannot be submitted to bacteriological investigation. Whether or not a positive result from the third method excludes a positive result from the fourth method, or the opposite, has not yet been determined. It would seem, however, that a positive complement-fixation test for any one germ would exclude a possibility of obtaining a growth of that germ by culture from the blood. In cases of chronic arthritis the first three methods have been employed by many investigators without result, while a few have found by the second method foci of infection with streptococci and other germs (Ball, Smith, Horder).

Of the typical cases of arthritis deformans, of from two to fifteen years' duration, he found that 6 reacted to strains of streptococcus viridans. From 4 of these cases the same organism was isolated from a tooth-socket after the extraction of a tooth—in three of the four, complement-fixation tests were found positive before the infection of the alveolar processes was looked for. One of these cases reacted to gonococcus also. Four cases of typical arthritis reacted to the gonococcus; one of them to streptococcus also. Three cases, which were classed from this history as infective deforming arthritis, reacted to the gonococcus. The deformities were typical of arthritis deformans. In 12 cases of typical arthritis deformans the tests were negative for the Wassermann reaction, and for the gonococcus, the streptococcus and staphylococcus. Improvement under treatment with injections of vaccine, considered specific, on account of the complement-fixation tests, has strengthened the supposition that some cases of arthritis deformans are infective in nature and that the infecting germ may be a streptococcus viridans or a gonococcus.

Vetlesen quotes from Eyerlen's "*Materia rheumatica ad tonsilas deposita*" (1789) to show that the connection between tonsillitis and rheumatism has long been known, but it seems to have been forgotten for a century. He reviews the experiences in this line at the Christiana Public Hospital, describing some cases of general sepsis from chronic tonsillitis and 14 cases of acute rheumatism in which 78 per cent. of the patients had a manifest acute or chronic tonsillar affection.

It has been shown that epidemics of sore throat are spread through the milk-supply; therefore, this should be carefully investigated. Fifteen reports (see references to original articles) of epidemics due to this cause have been made in the past year and indicate the importance which this subject has assumed.

Davis states that he examined the extirpated tonsils from 113 patients. They were removed from patients with a variety of clinical conditions, chiefly joint lesions, nephritis, heart disease and recurring tonsillitis. There were 28 cases of arthritis, ranging from simple joint pains to chronic arthritis. Hemolytic streptococci were found as the predominating organism in 25; in 2 cases the pneumococcus predominated, and in one case the streptococcus mucosus, but hemolytic streptococci were also present. Rabbits were inoculated intravenously with streptococci from 17; joint lesions were produced in 15; endocarditis in one with

arthritis. Pneumococci from 5 cases were injected, and in one instance a fatal arthritis developed. In 9 out of 10 cases of nephritis the streptococci predominated in the tonsils. In some a few pneumococci were present. Streptococci from 8 of these cases were injected into rabbits and produced joint lesions. The kidneys were negative. Ten cases of endocarditis complicated by arthritis showed hemolytic streptococci predominating in 6 and pneumococci in 4. Streptococci from 4 cases were injected into rabbits and produced arthritis. Pneumococci from 3 cases were injected and endocarditis developed in two instances. Joint lesions did not occur. Out of the 50 cases of recurrent tonsillitis hemolytic streptococci predominated in all but 2, in which pneumococci predominated. In a few cases other streptococci—*influenza bacilli*—were also present. Strains of streptococci from these cases were tested on rabbits. In nearly every instance the animals developed arthritis similar to that produced by streptococci from the other groups. In one case of multiple neuritis without arthritis or heart lesions the crypts of the tonsils contained a pure growth of hemolytic streptococci which produced a fatal multiple arthritis in rabbits. Usually the arthritis produced by these injections was multiple, and in several instances the condition became chronic. Microscopically the most striking feature of these tonsils was the occurrence of minute abscesses far down in the bottom of the crypts. The streptococci were usually found in the crypts and the pneumococci on the surface of the tonsil. Vaccine therapy in some cases, especially those associated with hematuria, appeared to have a favorable action. Pneumococci rarely produced arthritis; they usually localized on the heart valve.

The changes in the joints of rabbits inoculated with hemolytic streptococci were studied by Jackson after periods of four, five and seventy days; those produced by *streptococcus mucosus* at the end of ninety-five days, and the joint changes caused by *streptococcus viridans* at the end of one hundred and thirty-six days. The largest number of joints studied were from the rabbits inoculated with streptococci isolated from human lesions produced by the milk epidemic. These animals died or were killed after periods of two, four, ten and twenty-four hours, and two, three, four, seven, eleven and thirteen days. The alterations described depended on the early and apparently simultaneous and independent localization of the bacteria in the joint cavity, in the tissues surrounding the blood-vessels of the synovial membrane, plica synovialis, tendon sheaths and blood-vessels of the periosteum, and bone-marrow near the epiphyseal cartilages. The rather extensive involvement of the peri- and parasyovial structures such as tendon-sheaths, epiphyseal cartilages and bone-marrow were perhaps more marked than has been described by others.

The nodular formations developing in the tissues about the joints were essentially similar to those described in the myocardium of some of these same animals, and constituted a feature of the healing or later stages of the inflammation produced not only by *streptococcus viridans*, but also by the streptococcus from the epidemic. Of two points deserving special mention, one is the vulnerability of the triangular, loosely constructed fibro-areolar tissue projecting into the joint laterally, the so-called plica which contains varying amounts of adipose tissue. It may be that the spirally arranged blood-vessels here offer exceptional opportunities for the lodgment of bacteria or are as much end-vessels as those next to the epiphyseal cartilages. The other point concerns the influence on the

character of the inflammatory process exerted by the peculiarities of joints in that they are at the same time free surfaces and closed cavities. Jackson suggested that these features contribute in ways we do not fully understand to the results of infection, especially the absorption of inflammatory exudates and the extent to which healing is possible.

During more recent investigations the two groups of organisms described by Crowe as diploid streptococci and staphyloid cocci, respectively, in a previous paper, have been subdivided: the former into three varieties of streptococci, the latter into some six distinctly different organisms—staphyloid coccus A, staphyloid coccus B, staphyloid coccus C, staphyloid cocci D and E, staphyloid coccus F. Out of 22 cases of rheumatoid arthritis, 19 were almost certainly infected by staphyloid coccus A. This coccus appears on Fleming's medium first as a rose-red colony, which gradually increases in size and deeply indents the medium. It then spreads out and assumes the appearance of a flattened plate. On subculture it maintains these characteristics and does not alter in color. Its other peculiarities are that blood is slightly hemolyzed; that litmus milk is turned acid, clotted and usually decolorized; and that gelatine is liquefied very slowly, or not at all. Maltose and lactose are reduced, but not mannite; glycerine may or may not be reduced. The shape and color of the colon on neutral red-egg medium were, however, the two points on which it was perfectly safe to found a diagnosis. This coccus occurred with remarkable frequency in rheumatoid arthritis. Whether the connection between them is causal or merely incidental, Crowe has not determined.

Booker says less attention has been given to the possible entrance of bacteria from the gums than the subject deserves. He states that all are familiar with synovitis following gonorrhea or other forms of septic catarrh of the urethra and vagina, and with the arthritis of pyemia, and of the acute fevers, such as scarlatina, measles, typhoid, and influenza. Pneumococcal infections of joints are also recognized, but are not usually so definitely traceable to an attack of pneumonia as in the other cases he gave. He found that in many instances it was difficult to trace the joint trouble to any of these latter, and thought it behooved us to examine closely into the state of the teeth and gums in every attack of synovial inflammation of non-traumatic origin. Even when acute synovitis followed upon blows, strains, and other forms of non-penetrating injury, it was equally incumbent on us to include in our examination, for possible portals of infection, the teeth, mouth and pharynx, for the injury might be only the factor determining where a previous infection should manifest itself.

Goadby in an elaborate article states that arthritis can be specific only in a limited sense, *i. e.*, in a specific infective disease, the organism causing the disease affecting also the joints and peri-articular tissue; hence, it followed that diseases of the mouth which are due to infection with particular micro-organisms may be complicated with joint symptoms, and, as the disease in the mouth rarely gives rise to pain and only occasionally are the symptoms noticed by the patient, the original seat of the disease may be easily overlooked. He says the earliest work on the bacteriology of arthritis deformans is by Schueller, who obtained fluid from the joints of arthritis deformans (rheumatoid arthritis) and grew from the fluid an organism—a short bacillus. He found this organism in the peri-articular structures of the joint and not in the exudation fluid, and he claimed to have produced rheumatic symptoms in the joints of animals by intravenous injection, but more certainly by inoculation into

the joints themselves. Blaxall and Banmantyre in 1896 found bacilli in the peri-articular structures of arthritic joints; in two of their inoculated animals joint swellings were produced, but on the whole the animals showed little reaction to the inoculation. Goadby's researches were directed to determine the special mouth organism causally associated with various arthritic symptoms: mouth disease or oral sepsis, to use a generalized term, so frequently complicated with chronic arthritic changes that the clinical association appeared undoubted. He reports that the organism obtained from the majority of the mouth lesions in arthritic cases and which produced these changes in the joints of inoculated animals is a streptobacillus, which he had provisionally termed the streptobacillus malæ. It resembles in its morphology, but not in its cultural characters, the streptobacillus described by Ducrey as the cause of soft chancre. In many ways the organism resembles a streptococcus, but is easily differentiated from the streptococci by its morphology and cultural characteristics. He found very definite clinical changes followed the inoculation of the vaccines in most instances. Somewhat acute exacerbation of the joint symptoms took place, followed later by general improvement, and in more than half of the cases by complete recovery. There is, therefore, he believes, enough evidence seriously to investigate the mouths of persons suffering from subacute or chronic arthritis deformans (rheumatoid arthritis) for a possible source of infection. He has asked what constitutes a source of oral infection, and says not necessarily bad teeth. In many of his cases no caries or decay of the teeth was present, the patients having had their mouths regularly attended to every three months.

Gilmer believes that as a gathering place and incubating centre, the diseased mouth affords great opportunity for pathogenic bacteria. Few mouths are free from lesions of some sort. Granulating pockets in the gums about the teeth, from mechanical causes or from pyorrhea alveolaris, contain at all times a great flora of various species of bacteria. From these foci of infection opportunity is afforded for the passage of micro-organisms to other parts where they may be instrumental in the production of various lesions. Chronic alveolar abscess is very prevalent. Some of the bacterial poisons from these infections are absorbed and under favorable conditions cause toxemias. Micro-organisms from alveolar abscess at times gain access to the blood and lymph streams, and when carried to a weakened heart, lung, or kidney may be productive of serious lesions. Mouth-breathers admit the mouth bacteria far in excess of the normal; therefore, in case of stenosis in the nasal fossæ, greater opportunity is afforded for infection through the oral cavity. Tubercle bacilli are found in the mouths of non-tuberculous patients. The diseased pockets in the gums and jaws, as well as the tonsils, permit the easy passage to the cervical and submaxillary lymph-glands. Streptococci when disseminated from diseased mouths cause at times serious infections, such as Ludwig's angina. Pharyngitis and tonsillitis are natural results of oral infections. The bacteria of chronic alveolar abscess and the laws of immunity and susceptibility must be better known before we can positively determine the relation existing between alveolar abscess and subtle phenomena which may be dependent on them.

Lambert, in a special inquiry into the causes of rheumatoid arthritis, states that in 172 cases of rheumatoid arthritis where special inquiry was made for an infective focus, 141 of the cases (76 per cent.) had badly decayed teeth or the teeth had dropped out.

Shaumbaugh said that in few of the cases which he observed had the tonsils been large. The patients were nearly all adults. A diseased tonsil need by no means be a large tonsil. The small tonsil in the adult is more frequently the cause of trouble than a moderately enlarged tonsil. The throat examination often proves negative.

Pierce says that no tonsils should be removed unless there is local evidence of disease or a definite history of previous inflammation. An operation which falls short of entire enucleation is worse than no operation at all, and enucleation of the tonsil is of some gravity. He has seen two patients, both young men, who suffered from acute articular rheumatism, whose tonsils had been operated on and ostensibly removed. The rheumatism continued. He enucleated the remaining tonsillar tissue carefully, and neither patient has had another attack of rheumatism, except in one of the cases, in which the patient had a slight attack immediately after the operation, while still in the hospital.

Brown reported a case having repeated attacks of endocarditis and rheumatism which endangered his life. Repeated examination revealed apparently normal tonsils. One day the patient complained of a scratchy feeling in his throat, and on examination some cheesy deposit on one tonsil was present. The next day he had an attack of endocarditis. He removed this apparently affected tonsil. It was negative. He removed the other, and found three encysted masses. Since three years the patient has not had any more rheumatism or acute attacks of endocarditis. Another case had had heart trouble for fifteen years with blood-culture showing a pneumococcus infection due to a chronic sinusitis from the pneumococcus. He cites a case of a fellow-practitioner who cured an intense case of recurrent furunculosis by treating a bad pyorrhea.

Marshall's summary as to this treatment of chronic joint disease due to enterotoxemia and other intestinal conditions is as follows: Substances which are ordinarily harmless and constantly present in the circulation have their complete significance often ignored or minimized owing to the fact that they are so familiar. Variations in amounts of comparatively harmless circulation waste-products from intestinal bacterial activity probably give rise at times to pathological changes in various body tissues. Etiological obscurities at times are caused by unusual combinations between two or more exceptional variations in well-known conditions. Origins in such instances are likely to be attributed erroneously to assumed unknown specific causes which really do not exist. Gout and intestinal toxemias illustrate such etiological obscurities. The confusing clinical manifestations of gout, and of certain mild intestinal toxemias with arthritic lesions, can be explained satisfactorily only on the basis that such persons possess unusually non-resistant joints, or that excessive amounts of mildly irritating waste-products associated with these conditions circulate in the blood, or that both of these unusual variations in blood and joints simultaneously exist.

Proportions between factors, instead of independent single values of any one factor, determine the development of pathological changes. For example, abnormal concentrations of vascular constituents depend upon the ratio between the rate of absorption and rate of excretion; and again the development of pathological joint changes depends upon the ratio between articular resistances and the degrees of irritation produced by vascular constituents acting upon the joints, rather than upon the absolute quantities of irritants in the blood. The latter may be excessive without symptoms if joints are unusually resistant. Any single factor

may have either large or small values independently without upsetting normal, healthy relations, provided other factors vary in the same proportion and in the same direction. On the other hand, when variations among related factors occur simultaneously in opposite directions, and lead to deviations in the blood from normal healthy proportions, then pathological changes make their appearance as soon as tissue resistances are overcome. Comparatively slight variations combined in this way can produce pathological appearances in some instances. Many grades in severity of arthritic symptoms that are observed clinically can be explained best by remembering the many different values that are possible theoretically in the ratio between variable tissue resistances and variable vascular concentrations in the same person and among different individuals.

In practice it is possible to regulate proportions and ratios therapeutically between contributing elements without knowing their absolute values. Restoration of health is accomplished simply by increasing or diminishing one factor while the others remain unchanged; or more effectively it is done by making the other factors diminish or increase simultaneously in opposite directions from the first one until symptoms subside and healthy balances are regained. Low resistances to circulating urates and intestinal bacterial substances are likely to occur simultaneously in other tissues besides the joints, and must be acknowledged to exist in order to explain satisfactorily all the other variable clinical appearances that accompany gout and intestinal toxemias. Among them severe gastro-intestinal symptoms of gout and visceral saggings, associated with intestinal toxemias, must be ascribed primarily to a harmful influence of circulating substances directly upon the tissues of the stomach and bowel. The products of intestinal bacterial activity which give rise to mild auto-intoxications are probably derived mainly from the colon group of bacteria because the latter almost always predominate in the intestinal flora. Other species of intestinal bacteria probably contribute their smaller share at times, and special organisms like *Bacillus aerogenes capsulatus* or streptococci, which not infrequently are present in the intestinal contents in considerable numbers, perhaps produce toxemias dependent upon the substances that are developed only by these organisms. With these latter bacteria the quantitative as well as the qualitative effects of their metabolic products in the circulation ought to be considered of importance in the production of pathological changes.

Hughes says that the three main points in the treatment of arthritis deformans are: (1) To find the infecting organism; (2) having found them, to raise the opsonic index of the individual against these organisms—this is most quickly accomplished by the use of autogenous vaccines; (3) having rendered the patient artificially immune, to remove where possible the primary focus and apply local treatment to the affected joints. The commonest foci of infection in his cases have been the teeth, ear, intestines, lungs and genito-urinary organs. He reports cases due to local infections of these organs relieved and improved by the exhibition of the treatment outlined above.

Lindsay has found that in a certain percentage of cases, infective foci would appear to play as important a rôle in the etiology of rheumatoid arthritis in children as, he believes, obtains in adults. In the 16 cases quoted in his paper, infective foci were present in 6 cases contemporaneously with the onset. In many cases, however, as in adults, no definite exciting cause could be ascertained, the condition manifesting itself in

children who were to all appearances in the best of health at the time of onset. It was his opinion that in these cases of unknown origin there had existed some cryptic infective focus, but he states this is merely speculation. He gives general symptomatic treatment in detail, and considered no case had been properly investigated unless search had been made for the infective focus. A systematic examination of all the orifices of the body—the mouth, nose, ears, rectum, and vagina—ought, he maintains, to be made in each case; and, if anything was found, attention ought to be directed at once to such centres, and the infective focus eradicated, and if possible a vaccine prepared from the discharge and administered to the patient.

Luff says with regard to treatment of arthritis deformans that every effort should be made to discover the primary source of infection, and, if found, to remove it; this especially applied to those cases which are secondary to pyorrhea alveolaris. The mouth, tonsils and nasopharynx should be carefully examined; otitis media should be treated if present; the lungs should be examined for the presence of bronchiectasis; the intestinal tract should receive attention, especially as regards dysentery and colitis; the genito-urinary organs should be carefully investigated; and any source of infection, such as an open sinus, should receive suitable treatment. In most cases of infective arthritis he thought an attempt should be made, when possible, to discover the responsible organism and, if found, to employ an autogenous vaccine. In the great majority of the cases of rheumatoid arthritis, however, he could not find a responsible organism, and he then employed symptomatic treatment. He found the most useful drugs in the treatment of rheumatoid arthritis to be guaiacol carbonate and potassium iodide. He employed guaiacol in several thousands of cases, and as the result of his experience he did not hesitate to say that, if administered in sufficient quantities and for a sufficiently long period, it was capable in the great majority of cases of arresting the disease, of diminishing the size of the joints, and of permitting increased movements. It also relieved pain markedly. He found it useful both in the subacute and chronic forms of rheumatoid arthritis, and thought the guaiacol probably acted by inhibiting the growth of the specific micro-organism in the intestinal tract, and after absorption by combining with the bacterial toxins and assisting in their elimination.

Murrell believes that the only effective method of treating gonococcic arthritis is by vaccine therapy, and that, with certain reservations, the ordinary stock gonococcic vaccine is of very little value. He recently saw a man who for many weeks had been treated on those lines without benefit, the explanation being that the gonococci had long since disappeared and had been replaced by a diphtheroid bacillus which was the cause of the mischief. He stated somewhat better results were obtained by vaccine prepared from a recent alien gonococcic urethritis, but even that left much to be desired. He was not in favor of the particular form of polypharmacy in these vaccines, composed of several strains, and as far as possible discarded the alien vaccines and used only auto-vaccines, believing the antidote prepared from the patient himself of infinitely more value than a remedy obtained from an unknown source. In some cases he had used large doses, even up to 500,000,000, every three or four days. It is said that the dose for urethritis should be 75,000,000, for iritis 250,000,000, and for arthritis 500,000,000, but he did not endorse the action of the medical man who gave an initial dose of 825,000,000. He was in accord with Hartwell, who

found that autogenous vaccines were valuable in all stages of gonococcic arthritis except when ankylosis had occurred. He has treated many cases with alien vaccines, the doses of the injections being gradually increased from 5,000,000 to 200,000,000. The number of injections given ranged from 8 to 25, but in a chronic case these were inadequate. In 3 cases of his the number of days in the hospital was sixty-seven, seventy-six and one hundred and fourteen days respectively. Better results were obtained by autotherapeutical inoculations; the actual organism causing the arthritis was isolated and the results were naturally more satisfactory. In a case of gonococcic arthritis of four months' duration, treated with an autovaccine, the organism being a diphtheroid bacillus obtained from the urethra, the first injection of 5,000,000 was given on June 1st and was gradually increased to 50,000,000. By the end of July, twenty injections had been given and the condition was cured. Valuable as the inoculations were, he concludes that local treatment, described in detail, of the lesions present must accompany the vaccine treatment.

The earlier the recognition of rheumatoid arthritis, says Barr, the more successful the treatment. Attention should be first directed to the *prima via*—the teeth should receive scrupulous attention and all sepsis should be eradicated; the acid fermentation in the stomach should be eliminated, and this is most readily accomplished by cutting off all saccharine and farinaceous articles of diet, and placing the patient for a few days on an abundance of red meat with plenty of hot water. Red meat produces ammonia, which neutralizes the sarcolactic acid in the muscles; then milk should be used, to which some sodium bicarbonate and chalk or lime water have been added, junket and cream. Afterward green vegetables and farinaceous food, except oatmeal, and a fair amount of fat should be given, especially olive oil or cod-liver oil; at least an ounce of one of these oils should be given every night at bedtime. Bacon gravy, fat bacon, cream, butter or margarine are valuable adjuncts, but beef or mutton fats had better be eschewed. The patient should take a liberal allowance of table salt with meals. All acids and acid fruits, rhubarb, tomatoes and asparagus should be avoided. When saccharoses are considered permissible, glucose and honey are better than cane sugar or jams, but perhaps a little marmalade may be allowed occasionally. When the patient is improving, grapes, bananas, nuts, stewed prunes and figs may be allowed; saccharin is better than sugar, more especially when the urine has become alkaline under treatment, and tends to deposit phosphates.

Regarding drink, there is nothing better than pure water, especially when hot, weak tea, milk and soda water (containing about 30 grains of sodium bicarbonate to the pint), plain barley water and raisin tea. Avoid all sweet and acid drinks, wine and malt liquors. Alcohol, Barr thinks, should be interdicted, but if for any particular reason a little is ordered, it should be in the form of whiskey, gin, brandy, sloe gin or cognac. To correct the acid fermentation and improve the motor function of the stomach a good combination consists of bicarbonate and 15 or 30 grains of aromatic chalk in a glass of milk about half an hour before meals, and a double dose at bedtime; often smaller doses suffice. An excellent stomachic of calcium chloride, hydrochloric acid and minute doses of the perchloride of iron is very useful after meals; a small cholagogue pill should be administered regularly to keep the bowels open; for this purpose an excellent mixture could be made with the sulphate, bicarbonate and salicylate of sodium, and liquorice.

He thinks it is imperative to get lime into the tissues and to lessen its

elimination. For this he prescribes freely chloride of sodium and potassium, sodium bicarbonate, chalk, lactate of lime and calcium glycerophosphate. If it be desired to get calcium rapidly into the tissues it might be given in a very dilute form subcutaneously, say a pint of sterile normal saline solution with 0.05 per cent. of calcium chloride, and 3 per cent. of syrup of glucose. If the calcium chloride be administered hypodermically in a concentrated form, it may readily produce gangrene of the skin and adjacent tissues. Iron is best administered in the form of underdone red meat, and yolk of eggs; arsenic, potassium iodide, guaiacol, and a host of remedies commonly prescribed are worse than useless. Leucorrhœa should be treated with injections, and any infection of the urinary tract should receive attention. Here vaccines will often prove useful, and the same may be said for pyorrhœa alveolaris. General massage improves nutrition, and is highly beneficial; the hot air and electric light baths applied to affected joints often give much relief, but can scarcely be looked on as curative agents. The patient should be encouraged to exercise short of fatigue when the disease has subsided, and to live hygienically.

According to Luff, rheumatoid arthritis is a constitutional disease, not a local one—the affection of the joints is only a part, although an important part, of the morbid process. It is, he believes, a disease due to the presence of micro-organisms which gain access to the blood in the majority of cases probably through some chronic catarrh of the alimentary tract, although the invasion may occur from the mouth, nose, pharynx, or air tubes. After gaining access to the circulation they find a suitable nidus for their growth in the joints, where they grow and propagate in the synovial membranes, ligaments, cartilages and bones. As a result of their presence inflammatory changes occur which result in ulceration, erosion, destruction and, coincidentally, as a rule, in hypertrophy. Preceding the joint symptoms he found certain premonitory symptoms which sometimes existed for a long time before the joints were definitely attacked and which he thought probably due to the action of the toxin produced by the micro-organism concerned. He states that these prodromata have been well described by Macalister and Jones, and consist mainly of certain Raynaud-like phenomena producing the dead, grey-blue looking fingers and numbness of the extremities which precede the classic symptoms of the disease,—tinglings, numbness and shooting pains being common at this stage with about the same time muscular spasms which gave rise to cramp-like contractions in the hands and feet. He recommends douche massage as the most effective form of treatment with hot water, and perhaps next to that peat baths and brine baths. Electric light baths, in which the affected joints are bathed in the heat and light rays reflected from a number of incandescent electric lamps, he considers also beneficial in many cases. In cases in which the joints have become more or less fixed by fibrous adhesions and by fibroid thickenings of the synovial and periarticular tissues, he says fibrolysin is of great use in effecting a softening of the fibrous thickening, and if this were followed by massage of the affected parts the thickened tissue would stretch and undergo absorption. In the early stages of those forms of rheumatoid arthritis which are associated with Raynaud-like symptoms and cramps in the extremities, thyroid extract is of great value, but he had not found it of any appreciable value in the later stages. Seaside resorts are not suitable for most cases; as a winter resort there is no better climate than that of Egypt.

Stockman maintains that chronic rheumatism is not due to active

microbic infection, but that it is a fibrosis which may affect white fibrous tissue very locally or very widely, and is caused by a number of preceding acute diseases. Beyond a moderate degree of analgesic action, salicylic compounds had no effect on its course or symptoms. This is only what was to be expected, as the pathology and symptoms of acute and chronic rheumatism have nothing in common.

He stated that if there is much gastric acidity salicylic acid is precipitated in the stomach from sodium salicylate, and as it is capable of causing a considerable amount of irritation, indigestion not infrequently results; and that this could be obviated by prescribing it with a moderate dose of sodium or potassium bicarbonate, and if to this a bitter is added, the somewhat nauseous sweet taste of the mixture could to a certain extent be disguised. Salicylic acid, he further states, was too irritating for internal administration, but is undoubtedly the most powerful antirheumatic drug known to us, the action of all salicyl compounds depending on the extent of their conversion into it in the body. Of these compounds salicin, acetyl salicylic acid, salol and methyl salicylate are, in his opinion, of the greatest clinical importance. Salicin has a bitter taste and is much less nauseous than sodium salicylate and can be conveniently given dissolved in hot water, in which it is fairly soluble. It only yields 43 per cent. of its weight of salicylic acid, and hence he finds the amount required at least double that of sodium salicylate, 20 or 30 grains every hour or two hours until one ounce has been given and then in smaller doses according to circumstances. Acetyl salicylic acid being very active and having a marked analgesic effect, he does not prescribe it with alkalis which decompose it; hence, it is apt to bring on nausea and vomiting if given continuously. He finds methyl salicylate also very apt to irritate the gastric mucous membrane; but in 10 to 20 minim doses up to 60 or 90 minims per day, given in emulsion, or on sugar, or in milk, it acts powerfully; and externally applied he thinks it unrivalled for its analgesic action in rheumatic conditions. He believes that salol and salicylate of quinine are antirheumatics only to the extent of their salicylic acid content—roughly about one-half in each case—hence their value in acute conditions is small; that sodium benzoate has the same specific effect as the salicylate, but exerts a less powerful and decided influence; on the other hand, however, it has the advantage of being practically non-poisonous and causing no disturbing side-effects. He found it could be given in 20-grain doses every two or three hours, with satisfactory results, in cases of uncomplicated rheumatic fever, but its practical usefulness was merely as a substitute for the more powerful salicylate when the latter could not be tolerated.

Jacobsohn illustrates his article with twenty-eight roentgen pictures, aiming to establish that hypertrophic arthritis is a well-defined morbid entity. It should be distinguished from other joint affections, especially those with a tendency to degenerative atrophy. He objects to the name deforming arthritis, as the characteristic feature of the affection is the hypertrophy, while this change of hypertrophy is not an essential feature in any other joint disease. There is little chance for restitution. Treatment should be based on the axiom: "Avoid rest, keep the affected joint well exercised." Repose may alleviate or cure the pain, but under rest the muscles are liable to atrophy. It should be the physician's task to prevent the development of atrophy; only exceptionally should long rest in bed or immobilization be allowed. Too often under rest and sparing the joint, the muscles become atrophied, interfering with the gait and causing

weakness and edema, and compelling the patient to spare the joint more and more until weeks and months may be required to undo the effects, if this is ever possible. The physician should insist on exercise of the joint, informing the patient that the trouble is of a chronic character, that it may flare up now and then, and the joint will never be entirely normal again, but that the affection is harmless and work should not be given up on its account, as movements of the joint in manual labor guarantee a better outcome than sparing the limb. When there is severe pain in walking and standing, he applies massage and medico-mechanical measures, supplemented by hyperemia treatment (hot air or suction apparatus) and faradization. When the hip-joint is involved, an orthopedic apparatus may become necessary; but operative intervention is only exceptionally to be considered—only when loose bodies cause pain or become lodged in the joint. He describes the clinical picture and roentgen findings in the various articulations in turn.

Armstrong noted the following biological, physiological and clinical data in connection with radium therapy: (1) Radium emanations contain 75 per cent. of the total energy of radium; (2) the mere presence of radium emanation initiates or intensifies chemical bodily processes, especially those of oxidation; (3) large doses of radium emanation given continuously destroy, or markedly hinder, the development of staphylococci, streptococci, fermenting bacteria, and sporiferous fungi; (4) radium emanation greatly increases autolysis, one important effect of this being the greater efficiency of the processes by which nucleoprotein is oxidized into the purin bases—an important fact, as disturbed metabolism is probably largely due to disturbed fermentation; (5) radium emanation increases the activity of the various digestive ferments as well as the chemical reaction, especially oxidation, activates any deficient ferment, and, as many of these are interrelated, probably influences a chain of others; (6) radium emanation has a marked solvent action on gouty and rheumatic deposits, increases diuresis and the excretion of uric acid as well as the amount of toxic material in the sweat and prevents the transformation of the easily soluble lactam urate into the less soluble lactim urate; (7) radium emanation greatly increases nerve power and vitality, its influence being very marked on the sympathetic nerve supply.

From a close study of over 200 cases of the various forms of rheumatic trouble, treated by radium emanation, he suggested the following reasons why radium therapy should be valuable in (1) acute rheumatism—(a) if microbic in origin, on account of its bactericidal properties, (b) if due to lactic acid intoxication, on account of its power of increasing the carbon dioxide output, as lactic acid is finally oxidized into carbon dioxide and water; (2) in chronic rheumatism, fibrositis, etc., if due to (a) suboxidation with retention of calcium salts, causing serious disturbance of metabolism and retardation of fermentation chiefly in connection with the combustion of the body, to (b) the fact that the excretion of carbon dioxide is largely reduced in damp states of the atmosphere, or to (c) the absorption of toxins from the digestive tract; then the previously noted effects of radium emanation would indicate its use in these conditions.

According to the article of Gudzent, solutions of radium salts are sometimes injected in the neighborhood of diseased joints; more commonly the preparation used is a solution of the radium emanation.

The first experiments made by Jackson with magnesium sulphate in treating rheumatism were in cases in which the salicylates had either failed to give results or had nauseated the patients. Five grains of the drug

were dissolved in 2 c. cm. of sterile water and injected deep into the muscles. Later on, he gave 10 grains, and at the present time he uses 15 grains at each injection. He applied saturated solutions of the same to inflamed joints, the solution being applied cold, covered with oiled paper, and allowed to remain *in situ*, the gauze being kept moist by pouring the solution down alongside the affected part. In some cases it was noticed that the injections of magnesium sulphate produced active purgation, but in others there was no effect on the intestinal tract. When it became necessary to relieve obstinate constipation, magnesium sulphate was given internally. Thus he has a triplex application of the drug, viz., locally, internally, and by intramuscular injection. His technique is very simple. The syringe he uses is the Luer, all-glass type, of 5 c. cm. capacity. All aseptic precautions must be observed in regard to syringe, solution, and site of injection. Any muscle that is handy is used as the point for injection, but he prefers the buttocks and infrascapular regions. At present, he employs a 25 per cent. sterilised solution, injecting 4 c. cm. into adults. Recently he has been using ampoules put up by H. K. Mulford Company, containing 4 c. cm. of a 25 per cent. solution. The injections may be given daily, when the symptoms are severe, for the first three or four days, but in no case has he found it necessary to give daily injections for more than three days, after which time the symptoms were so ameliorated that every other day to three days apart proved of sufficient frequency for the injections. He gives detailed history of good results with this treatment in a series of cases.

Midelton in writing on the thyroid extract treatment of arthritis deformans says the question of dosage is a most important one. Great care should be taken to ascertain as far as possible the degree of thyroid failure, and the dose should be adjusted accordingly. On general principles it is much better to give a small dose first, even if it is not a sufficient one. Much harm may be done by giving doses that are too large. Such a dose as 5 grains three times a day is to be reserved for cases of a distinctly myxedematous nature. For some of his patients, he has prescribed as little as $1\frac{1}{2}$ grains once a day. It should not be pushed to the extent of causing such symptoms as headache and diarrhea. It should be borne strongly in mind that patients suffering from rheumatoid arthritis are of poor resisting power and are not in a condition to withstand with impunity the effects of such a powerful substance if too much is given. As a matter of precaution he thinks it well to allow a few days' interval from time to time in any case. The pulse at any rate should be carefully watched. It is probably too much to expect that the practitioner will make careful records of blood-pressure at regular intervals with a special instrument, but the trained finger should be able to detect an undue fall; the pulse-rate alone is not an absolute guide, since emotion may be responsible for an increase quite apart from the remedy. As far as his experience goes, when thyroid failure has become thoroughly established, it will be necessary for the patient to take thyroid extract for the rest of his life in suitable doses. He considers that this point is not always sufficiently emphasized. Jones states that, although much gratified at initial success, he has often been disappointed at subsequent relapses. In the course of conversation with him, Midelton ascertained that he had not fully realized the necessity of keeping up thyroid medication indefinitely. Patients who have suffered from chronic illnesses, even when apparently quite cured, must always be on the *qui vive*, and should not fail to report regularly to their medical advisers. Treatment should be promptly and energetically resumed at the first sign of a relapse, even if the symptoms are slight.

The operation employed by Handley and Ball in the treatment of chronic hypertrophic arthritis, especially if it be uniarticular and of traumatic origin, consists in opening the hip-joint and removing the cornice on the head of the femur, so far as it is accessible, by suitable bone-cutting instruments devised to work in a cramped space. On account of its technical difficulty the operation is somewhat prolonged, but in two instances cited shock has been absent and convalescence uneventful. The authors suggest the name cheilotomy for this operation. They utter a word of warning against the indiscriminate application of the operation in unselected cases. For cases in which the constitutional or toxic element of osteo-arthritis predominates, the method is obviously unsuited, and other methods of treatment, including the vaccine treatment, should always be tried. Nor should the operation be undertaken save under the best conditions, with ample assistance, with all possible aseptic precautions and with the essential preliminary of a good stereoscopic radiograph of the joint. The best and most suitable cases are probably those in which the medical and vaccine treatment has improved the patient in relation to his or her general health, and in which the smaller joints (probably those most recently affected) have improved.

RENAL TUMORS.

A REVIEW OF RECENT LITERATURE.

By JOHN R. CAULK, M. D., of the Editorial Staff.

1. Abbé: Long-Lasting Cure After Removal of Sarcoma of Kidney in Infancy. (*Ann. of Surgery*, Vol. LVI, No. 3, p. 469, 1912.)
2. Barney: Symptomatology of Renal Tumors. A Study of 74 Cases from the Massachusetts General Hospital. (*Boston Med. and Surg. Journ.*, Vol. CLXVIII, No. 9, p. 300, 1913.)
3. Braasch: Clinical Data on Malignant Renal Tumors. (*Journ. Amer. Med. Assoc.*, Vol. LX, No. 4, p. 274, 1913.)
4. Caulk: Etiology of Kidney Cysts. (Ref. *Ann. of Surgery*, Vol. LVII, No. 6, p. 840, 1913.)
5. Cumston: Neoplasms of Renal Pelvis and Ureter, Report of a Case. (*Amer. Journ. Urol.*, Vol. LX, No. 1, p. 21, 1913.)
6. Gerster: Nephrectomy. (Ref. *Ann. of Surgery*, Vol. LVI, Nos. 1 and 2, pp. 1 and 256, 1912.)
7. Keyes: Textbook of Genito-Urinary Surgery.
8. Pettis: A Case of Neoplasm of the Remains of the Wolffian Body Simulating Hypernephroma. (*Physician and Surg.*, Vol. XXXV, No. 1, p. 27, 1913.)
9. Luger: Value of X-Ray Findings of Intestine in Tumors of the Kidney Region. (*Wien. klin. Wochenschr.*, February 13th, 1913.)
10. Stevens: Pathologic Lesions of the Kidney Associated with Double Ureters. Report of a Case of Hypernephroma. (*Journ. Amer. Med. Assoc.*, Vol. LX, No. 26, p. 2298, 1913.)
11. Stone: Hypernephroma of the Kidney. (*Surg., Gynec. and Obstet.*, Vol. XV, No. 6, p. 665, 1912.)
12. Vogel: Advances in Kidney Surgery. Two Cases of Kidney Cysts. (*Zentralbl. fuer Chir.*, Vol. XXXIX, No. 45, p. 1540, 1912.)
13. Wilson: Embryogenetic Relationships of Tumors of the Kidney, Suprarenal, and Testicle. (*Ann. of Surgery*, Vol. LVII, No. 4, p. 522, 1913.)
14. Young: A case of Hypernephroma of a Displaced Kidney Simulating Ovarian Cyst. (*Boston Med. and Surg. Journ.*, Vol. CLXVII, No. 17, p. 588, 1912.)

"Recognizing the obscurity that still shrouds the origin and nature of so many renal growths, I shall not endeavor to follow any pathological theory or even to discuss the opposing theses advanced by different authors," remarks Keyes in the opening words of his chapter on Solid Tumors of the Kidney. He quotes Kelynnack as saying the purely scientific aspects are by general admission very obscure.

Etiology.—Sex: In 112 nephrectomies of Gerster from records of

Mount Sinai Hospital, 18 were performed for neoplasms: 12 in males, 6 in females. Cysts of the kidney arise at the cortex, left kidney, lower pole in women (Vogel). Serous cysts are infrequent; males and females are affected equally. Barney in 74 cases from the Massachusetts General Hospital records males 43, females 31.

Age: Varies from six months to fifty-six years; majority of cases about forty years (Gerster). In Barney's cases the age varied from one year and ten months to sixty-six years, the majority being in the fourth decade, the next largest in the fifth. Wilson's 3 cases of embryomata occurred in children five years of age and under. As complicating diseases Gerster found 2 cases of nephrolithiasis and several of pyelitis in 18 cases of renal neoplasms. Stevens reports a case of hypernephroma associated with double ureters. He describes, as the origin of the double ureter, a cleavage of the renal bud, but says there seems to be no embryological relation between the anomalies of the collecting apparatus and the renal tumor.

Race: White race, 73 cases; negro 1 case (Barney). Gerster's 18 cases were all in Caucasians. Ecchinococcus was the exciting factor in 2 cases. The left kidney was attacked twice as often as the right. Left side affected 41 times, right 30 times (Barney). In cystic diseases the findings show the right side to be more often affected than the left. Vogel quotes Ruckert as saying all kidney cysts are congenital, and also mentions Braunworth's statement that in fetal kidneys cysts arise from infoldings in normal kidneys. He also gives Dunger's groups of cysts—namely, urinous cysts related to retention cysts, cysts following chronic inflammation, and cystic kidney. Some cysts of the kidney are of congenital origin; many, however, are due to retention following obstruction (Caulk). In tumors of the renal pelvis and ureter, in nearly all cases, the growth is secondary to some preexisting pathological condition, chronic irritation being the causal factor (Cumston). Papillomata and carcinomata are secondary to chronic irritation in the renal pelvis and collecting tubules, according to Wilson. Squamous-celled carcinoma (pelvic) is due to enclosure of ectoderm from the rectum by the cloacal wall. Embryomata (Wilms' tumors) are due to inclusions of the lateral plate (which develops muscle, etc.) by the caudal end of the nephrogenic cord. Mesotheliomata (Grawitz' tumors) arise from masses of nephrogenic tissue which have never become connected with the renal pelvis (Wilson). The renal capsule is the site of inclusions of the mesonephron, Wolffian body, and adrenal gland. Wilson reports three adrenal hypernephromata, readily differentiated from kidney tumors, so-called hypernephromata, and gives this as negative evidence against the Grawitz theory of adrenal inclusions in kidney hypernephromata. As further evidence he brings forward arguments as follow: (1) Occurrence of hypernephroma (renal) in lower pole of the kidney, adrenal rests should occur in the upper pole; (2) renal hypernephromata do not correspond to adrenal tissue in fat and glycogen content; (3) he questions why adrenal rests in the kidney should give rise to tumors so frequently when in other localities and in fact in the adrenal gland itself tumors thus arising are rare. Stone gives Keen's definition of hypernephromata as tumors arising from adrenal tissue in the normally placed gland or in adrenal rests (ectopic fragments).

Pathology.—Gerster's 18 cases were as follow: Cystic adenoma 1; sarcoma 7; hypernephroma 7; carcinoma 3. Two nephrectomies were performed for hydatid disease, very rare in the kidney. Calcification of the sac is of utmost rarity; it occurred in one case; this patient passed second-

ary hydatids. Nephrectomy was performed once for polycystic disease, a condition which was given little attention in the articles mentioned. Abbé describes a sarcoma of the kidney in an infant as a large growth springing from the upper pole of the right kidney, the capsule of the kidney continuous with that covering the tumor. "The tumor was solid, sarcomatous, semicystic in parts, resembling, as did many Grawitz' tumors, a section of firm tomato." The weight of the tumor was $7\frac{1}{2}$ lb., that of the infant 15 lb. Stone reports 3 cases of hypernephroma giving von Bergmann's description—nodular tumors, yellowish or brownish with a harder centre and a softer periphery, pressing aside neighboring tissue or infiltrating it, composed of connective-tissue stroma meshes, filled with cubical or polygonal cells containing fat and glycogen. As types of neoplasms of the renal pelvis and ureter, Cumston gives the following classification: Epithelial and mesodermic. Epithelial papilloma is most common. The site is the renal pelvis; the size is variable, from minute growths or small villous masses or pedunculated arborescences to large, soft, villous masses. Their color is red or grayish. They are very friable and bleed easily, and extension occurs by distant grafts. Microscopically, they consist of a connective-tissue framework covered with the mucosa of the renal pelvis: In papillary epithelioma, the renal pelvis is the initial site in 50 per cent. of the cases. They are papillomata, with areas of epitheliomatous infiltration or epithelial growths composed of cylindrical cells. Extension occurs by lymphatics, also by grafts. Epitheliomata are nodular infiltrating growths, extension occurring by metastases. The types are, alveolar carcinomata, columnar, and, rarely, squamous-celled carcinomata. Mesodermic tumors occur in children, are very malignant, and are of the following types: rhabdomyosarcomata and round or spindle-celled sarcomata. Wilson's material contained 92 cases of renal tumors, classified as follows: (a) tumors of pelvis and collecting tubules, (b) of cortex, (c) of capsule. (a) Papillomata and carcinomata. Three papillomata in the collecting tubules, in the apices of the pyramids; four renal carcinomata originating in the collecting tubules, one pelvic carcinoma, squamous-celled and ectodermic. (b) Three embryomata (Wilms' tumors), 71 mesotheliomata (hypernephromata of Grawitz); (c) one fibroma, two sarcomata which in adults beyond thirty-five years of age are apt to invade the renal cortex. The capsule is the site of inclusions of the mesonephron and adrenal gland. Pettis reports a case of neoplasm of the remains of the Wolffian body simulating hypernephroma. At autopsy was found a large cyst near the left kidney. Diagnosis was carcinoma in a cystadenoma, arising in remains of the Wolffian body or duct. A series of 83 malignant tumors was reported by Braasch, consisting of hypernephromata, sarcomata, carcinomata, and embryomata. Barney's cases counted 74, including hypernephromata 27, sarcomata 7, carcinomata 7, adenomata 3, endotheliomata 1. He adds that the cases of carcinoma are doubtful in the light of our present knowledge of pathology. Solitary cysts of the kidney are seldom observed clinically in contrast to polycystic disease (Vogel). They may grow to the size of a man's head, while the kidney proper shrinks. Cysts lying near the poles have thin walls often not distinct from the kidney substance. They are composed of many confluent cysts. The contents is clear or bloody.

As representing the retention theory of cyst formation in the kidney, due to sclerosis of a papilla, the writer has reported a case with the following features: (a) limitation of the cyst to the pyramid, (b) papillary incrustation of calcium phosphate. Serous cysts are infrequent. They

are single or multiple, generally unilateral, located at the pole, varying in size from that of a walnut to a child's head. Contents is clear, transparent or turbulent, gelatinous or caseous. Color: yellow, bloody, or colorless. Microscopically, the cyst wall varies in thickness from tissue-paper thinness to considerable thickness; at times very dense and fibrous, often calcareous. Canals, capillaries, arteries with endarteritis, and renal tubules are found in the external coat. Hyaline changes in the cyst wall are of frequent occurrence. The lining is cuboidal celled, flat celled, or absent. Benign tumors of the kidney are met with at times and are of the following types: Fibromata, lipomata, leiomyomata, angiomata, etc. This class of cases is not mentioned to any great extent or given much consideration in any of the papers reported.

Symptoms.—The duration of symptoms varies from a few days to ten years. In Barney's 74 cases, 28 sought relief within six months of onset of symptoms. In 13 cases, malignancy had manifested itself in general terms before the onset of local symptoms. The onset of symptoms was sudden in 34, gradual in 40. Loss of weight, gradual or sudden, occurred in 51 cases. Urinary disturbances (excluding hematuria) was noted in 21 cases. Urination was normal in 46. Nausea and vomiting, often independent of colic, due to toxemia or metastases to distant organs, occurred in 29 cases.

Pain.—This often occurred during sleep and was not aroused by muscular activity as when a stone is present. It is accounted for by passive congestion, pressure on nerve trunks, passage of clots or shreds, or temporary blocking of the ureter. Pain was the initial symptom in 25 cases, combined with tumor and hematuria in 6 cases each. It occurred at some time during the disease in 63 cases, and was the sole symptom in 10 cases. During the course of the disease, pain and tumor occurred 22 times; pain, tumor and hematuria 16; and pain and hematuria 15 times.

Hematuria.—This is often insidious in its onset and alternates with clear urine, occurring late or early, once or constantly, and often simultaneously with pain. Hematuria was the initial symptom in 18 cases. It occurred at some time during the disease in 39 cases. Hematuria and pain, as initial symptoms, occurred in 6 cases; hematuria and tumor, as initial symptoms, in one case; and as the sole symptom in 3 cases. During the course of the disease, hematuria, tumor and pain occurred 16 times; hematuria and pain 15 times; and hematuria and tumor 3 times.

Tumor.—It occurred as the initial symptom in 15 cases; as the initial symptom with pain in 6 cases; as the initial symptom with hematuria in one case. A lump was noticed during the course of the disease in 46 cases, being the sole symptom in 5 cases. During the course of the disease tumor and pain occurred in 22 cases; tumor, pain and hematuria in 16 cases; and tumor and hematuria in 3 cases. A tumor was palpable in 63 cases, tenderness was not constant. No urinary symptoms in one case. It is interesting to note that in this series of 74 cases, the tumor was palpable in a large majority. Urinalyses were made in 71 cases; the finding of albumin, pus, blood or casts was positive in 61 cases, negative in 10 cases. There were no tumor cells found in any case, and there was no marked rise in blood-pressure noted. Cystoscopy and ureteral catheterization were performed in a few cases, but did not give much information. A probable bladder metastasis was seen in one case, but it unexplainably disappeared. The x-ray is of little value beyond showing an occasional difference in the density or size of the two organs. Pyelography was evidently here not considered as in Braasch's report. "In view of the

known tendency of renal tumors, notably hypernephromata, to begin in the upper pole and hence escape early detection," Barney advised to examine the patient in other than the dorsal position. Most observers consider this location of the tumors rather the exception than the rule, especially Wilson. Varicocele (right) and renal tumor frequently go hand in hand. Varicocele and tumor (left) occurred in 3 cases of Barney's; suggestive caput medusæ in 4 cases, on the right in one case, on the left in 3 cases; hemorrhoids in one case; varices of both legs in one case. In Braasch's report of 83 cases the cardinal symptoms—pain, hematuria and tumor—were all present in 32 cases, 2 symptoms in 37 cases, one symptom in 14 cases. Hematuria was observed by the patient in 53 cases. It was the primary symptom in 39 cases, the sole symptom in 10 cases. The positive history of repeated hematuria was obtainable in 41 cases. Gross blood occurred in the urine in 33 cases; microscopical blood in 21 cases (not of diagnostic value according to Braasch). Tumor was felt on examination in 65 cases. It was known to 28 patients; the primary symptom to 12 cases; 37 patients were unaware of it. It was the sole symptom in 5 cases. The tumor was freely movable in 5 cases; slightly movable in 45 cases; fixed in 15 cases (12 of the latter were found inoperable). Pain, when accompanying renal tumor, is caused by pressure on nerve trunks, or by increased intrarenal tension from interference with urinary drainage. Pain from pressure may be referred and simulate gallstone colic, lumbago, etc. Abdominal pain occurred in 68 cases; it was the initial symptom in 27 cases, and the sole symptom in 14 cases. It was referred to the affected kidney in 50 cases, to both kidneys in 4 cases, across the back in 11 cases, diffuse in 8 cases; epigastric distress and nausea in 8 cases (this being the predominant and only symptom in 4 cases). Uranalysis showed gross blood in 33 cases; microscopic blood in 21 cases; gross pus in 5 cases; microscopic pus in 15 cases. Circulatory disturbances commonly found with mesotheliomata occurred as follow: Varicocele in 9 cases; vesical varices in 5 cases; and cardiac dilatation in 10 out of 21 inoperable cases. One case of hydatid disease of the kidney passed secondary hydatids (Gerster); and the duration of symptoms in these cases varied from three days to twenty years. On examination, emaciation and anemia were recorded in 5 cases; cachexia in one case; palpable tumor in 16 cases; urinary findings positive in 11 cases; elevated temperature in 5 out of the 18 cases of neoplasms reported. In hypernephromata, blood in the urine is exceptional, writes Stone, because as explained by some the growth from adrenal rests is near the upper part. Ureteral catheterization has not given much information in these cases. The tumor is rarely palpable. Percussion gives increased dullness if the growth is large. The temperature is often elevated and is accompanied by sweats due to a mild infection. The blood shows slight leucocytosis, and the hemoglobin is low. The blood-pressure is high, the skin rarely pigmented. These remarks of Stone are at variance with those of most writers, especially Wilson. Luger reports the finding of albumin and red blood-cells in the urine after long-continued palpation of the tumor. In pelvic and ureteral growths, the pain is colicky or a sensation of weight may be present (Cumston). Tumor is present *per se* only in mesodermic tumors, and is usually due to a uronephrosis or a hematonephrosis. Intermittent hematonephrosis is pathognomonic of these tumors. Mesodermic tumors compress abdominal viscera. In cysts the pain is fickle; 60 per cent. of the cases experience a dull ache or colic in the loin or hypochondrium. Hematuria is rare and urinary disturbances occur in

but few cases. The sensation of weight or of tumor, and of dyspnea or weakness, occurs if the cyst is large. Cystoscopy and ureteral catheterization usually fail. X-ray is of little value. If the cyst is large it is round, smooth, dull on percussion and at times fluctuates.

Differential Diagnosis.—Colonic inflation is mentioned in 4 of Gerster's 18 cases. Cumston differentiates pelvic and ureteral tumors from calculus, tuberculosis and renal tumors. A case of hypernephroma of a displaced kidney, simulating ovarian cyst, is reported by Young, the diagnosis having been made at operation. Interesting is Stevens' case of hypernephroma associated with double ureter in which the functional activity of the lower part of the doubly affected kidney equalled one-half of the upper, and blood came from the lower ureter and the corresponding part of the kidney. An hypertrophied kidney may simulate a tumor on palpation (Braasch), or low lying large kidneys may simulate tumors. Braasch differentiates renal tumor from (1) essential and nephritic hematuria, (2) retroperitoneal tumor, (3) bilateral cystic kidney disease, and (4) closed pyonephrosis. Aid to diagnosis is cough with negative chest due to diaphragmatic irritation or to metastases in the bronchial glands. Cystoscopy with renal functional tests are also valuable. Pyelography is important, as 75 per cent. of the pelves are involved and may show the following pictures: (1) spider leg picture, (2) thin streaks, (3) irregular dilatation, (4) retraction and dilatation of the upper ureter, (5) abnormal position of the renal pelvis. Neoplasm of the remains of the Wolffian body may simulate hypernephroma (Pettis). X-ray findings in the intestine may throw light on the case, as reported by Luger. In this case the x-ray showed an extraventricular tumor with a turning in of the shadow on the greater curvature; the mixture remained in the descending colon thirty-six hours; above there was a dilatation, below a filling defect. Once the colon was visible lying over the tumor, and the functional test showed delayed time of appearance on the affected side.

Treatment.—Nephrectomy was done by Gerster in all his 18 cases of neoplasm. In malignancy the fatty capsule and also the peritoneum ought to be removed *en bloc*. Use is made of the elastic ligature for the pedicle when the structures are large or too difficult to isolate. In neoplasms of the renal pelvis and ureter, Cumston advised nephrectomy with or without ureterectomy. In Abbé's case of sarcoma in infancy the lower half of the kidney was apparently free, so an amputation was performed. Nephrectomy was impossible in 22 of 83 cases reported by Braasch. In 16 cases the tumor was described as fixed. Symptoms of inoperability are fluid in the abdomen, edema of the extremities, weakness, metastases, etc. Nephrectomy was performed in 61 cases. Formerly cysts of the kidney were punctured either alone or with subsequent injections into the cavity, or cystotomy was performed. The most satisfactory plan is excision, or, if large, nephrectomy. In some cases the cyst can be shelled out as in the writer's case.

Result.—The kidney near the process may show inflammation or no change. Of 22 inoperable cases of Braasch, 15 were traced, and of these 13 were dead within a year. In 61 nephrectomies 7 died in the hospital, an immediate mortality of 11 per cent.; 51 were traced, and of these 10 were operated in less than one year. Seventeen cases were alive over one year after operation, 12 cases after three years, 4 cases after five years, one case after eight years; 27 cases were reported dead, 9 before one year, 2 at one year, 4 at two years, one lived three, four, and five years respectively after operation. The five-year cure was 10 per

cent. Gerster's mortality was 44 per cent., 8 deaths in 18 cases. The causes of death were as follow: shock, peritonitis, pneumonia, relapse. Death following operation occurred in 4 cases. Abbé's case remained well twenty years after removal of a sarcoma of the kidney. Of Stone's 3 cases, one was living and well within a year after operation, one was dead of recurrence in less than a year, and one died of malaria six years after operation.

Metastases.—Barney advises to be watchful for metastases, especially when lung symptoms of vague origin, gastric disturbances of idiopathic nature, or suspicious bone tumors occur. He observed metastases clinically in 8 cases. The supraclavicular glands were affected in 3 cases, the lung in 2 cases, the liver in one case, the spine in one case, the pelvis in one case. The records show that growth occurs by extension along the blood-vessels. The autopsies show the liver, brain and spleen hopelessly involved. Barney thus quotes Garceau in regard to metastases: "Bone is the favorite site, with the lungs and regional glands next. Metastases are common in the lungs, liver, bones, in or near the line of incision (Stone)." Recurrence in the incision occurred in several of Gerster's cases, resulting fatally.

TREATMENT OF LEUKEMIA.

A REVIEW OF RECENT LITERATURE.

By JEROME E. COOK, M. D., of St. Louis.

1. Koranyi (*Berl. klin. Wochenschr.*, July 15th, 1912).
2. Koranyi (*Wien. klin. Wochenschr.*, January 23rd, 1913).
3. Selling (*Ziegler's Beitr.*, Vol. 51, 1911).
4. Nemenow (*Zeitschr. fuer klin. Med.*, Vol. LXXV, Nos. 5 and 6).
5. Kiralyfi (*Wien. klin. Wochenschr.*, August 29th, 1912).
6. Stengel and Pancoast (*Journ. Amer. Med. Assoc.*, April 25th, 1908).
7. Stengel and Pancoast (*Journ. Amer. Med. Assoc.*, September 28th, 1912).
8. Krause (*Deut. med. Wochenschr.*, September 19th, 1912).
9. Bierman (*Deut. med. Wochenschr.*, January 4th, 1912).
10. Bryant and Crane (*Medical Record*, April 9th, 1904).
11. Senn (*Medical Record*, August 22nd, 1903).
12. Bangor (*Medical Record*, April 9th, 1904).
13. Falta (*Deut. med. Wochenschr.*, p. 874, May 2nd, 1912).
14. Klemperer and Hirschfeld (*Therapie der Gegenwart*, No. 8, 1912; No. 2, 1913).
15. Neuman (*Therapie der Gegenwart*, No. 2, 1913).
16. Stein (*Wien. klin. Wochenschr.*, December 5th, 1912).
17. Nagelschmidt (*Deut. med. Wochenschr.*, September 26th, 1912).
18. Billings (*Journ. Amer. Med. Assoc.*, February 15th, 1913).
19. Pappenheim (*Wien. klin. Wochenschr.*, January 10th, 1913).
20. Stern (*Wien. klin. Wochenschr.*, March 6th, 1913).
21. Wachtel (*Deutsch. med. Wochenschr.*, February 13th, 1913).
22. Roesler (*Wien. klin. Wochenschr.*, May 22nd, 1913).
23. Jespersen (*Hospitalstidende*, *Rev. Journ. Amer. Med. Assoc.*, p. 1038, March 29th, 1913).

While little has been added during the last few years to our knowledge of the etiology and pathology of leukemia, a certain amount of satisfaction may be gained in studying the more recent therapeutic efforts. Slight as the advance may seem in comparison with the progress of our therapy in certain other diseases, it can still be said to be a real gain over our previous practice. In judging the value of any therapeutic manœuvre in a disease like leukemia, which is known to undergo apparent spontaneous remissions and exacerbations, one must be careful not to attribute to a drug the improvements incident to the normal course of the disease. One of the first reports of the use of the x -ray in the treatment of leukemia was by Bryant and Crane. They gave an account of 2 cases, both of which were given arsenic, and one of which was treated with the x -ray. Both cases, however, showed marked improvement of the blood-picture and the other symptoms; hence, there was doubt as to the

part played by the x -ray. In 1903 Senn reported the successful treatment of a leukemic patient by the x -ray. His report received rather widespread notice; the method attracted the attention of the foreign workers, notably the Germans, and has since been a well-recognized, if not uniformly successful, method of treatment. Senn directed his x -ray therapy to the spleen, and incidentally to the end of the long bones, and in this has been followed by most of the workers.

Stengel and Pancoast, from a rather extensive experience, believe that much better and more lasting results may be obtained by the x -ray if certain modifications be adopted and a certain rather rigid regime be followed. In the first place, since it is rather generally conceded that the primary seat of leukemic disease, even in the lymphatic variety, lies in the bone-marrow rather than in the spleen and lymphatic tissues, it is most rational to direct the attention primarily to the bones, and incidentally to the lymphatic structures. This is not only sound theory, but good practice. Of course, the same difficulty in standardizing the dosage is met here, as in other x -ray work. A ten to fifteen minute exposure, daily if possible, to all the bones of the body except the skull, exposing one part of the body for three successive days, then passing on to the next, and so on until the original site of exposure is reached and the circle again repeated, gives the best and most lasting results with the minimum of toxemia which often results from the use of the x -ray in this condition. This method likewise usually avoids the x -ray burns which are so prone to occur after long, repeated exposures over the spleen. In fact, Stengel and Pancoast recommend that for the first two weeks no radiation be directed towards the spleen, and that after that the spleen should take its turn in the circle of radiations directed to the other parts of the body. Treatment should be continued without lengthy pauses until the blood-picture has returned to normal; and they are in agreement with most other writers on the subject, that the decrease and disappearance of myelocytes is a more reliable guide to the time for stopping treatment than the absolute white-cell count. The first sign that the condition is getting worse should call for a renewal of the radiations, according to the same plan. Proceeding, according to these plans, the authors kept patients in symptomatic good health and at their usual occupations for four years; and if the periods of observation had been extended, a still longer 'cure' would probably have been reported. It is unfortunate that in the case-reports of other authors, in which the x -ray was used, a more detailed account of the method and exact technique has not been given, for it is only in this way that we can arrive at the best methods with this powerful therapeutic agent.

It has been noted, almost from the first, that certain cases of leukemia did not do well with the x -ray. Leaving aside the cases of acute leukemia in which the ray probably always aggravates rather than helps the already serious condition, there are cases of the chronic type in which the use of the ray causes a distinct aggravation of all the symptoms, and other cases, often those which have previously been much benefited by the ray and have subsequently relapsed, which on renewed application of the treatment show no improvement whatever. Those of the former class would probably be much fewer were the x -ray dosage more carefully graduated and the exposure of the spleen postponed until improvement had commenced. Those of the latter class were, until recently, almost beyond our therapeutic efforts. A certain number of them would start to improve if arsenic were given in conjunction with the x -ray.

A much more powerful agent has appeared within the last year. It was Koranyi who first proposed using benzol in the treatment of leukemia. He was led to his clinical studies by the work of Selling on the effect of benzol injections on the blood-picture of rabbits. This observer noted that in rabbits, treated with repeated doses of benzol, there was first a transient increase of the white cells, followed after a time by their total disappearance from the blood. At the same time there developed a gradual aplasia of the bone-marrow and lymphatic apparatus, as determined by post-mortum on the animals. Cessation of the benzol treatment was followed by a return to normal in the blood-picture. Koranyi, and following him a large number of other observers have been able to note the same remarkable effect of benzol in diminishing the number of leucocytes in the blood of leukemic patients. At first there is a transient increase, followed in two or three weeks by a slow, and later by a rapid decrease in the number of white cells. In many of the reported cases the number dropped from two hundred thousand or more to normal, in the course of about eight weeks. Along with this improvement in the blood-picture goes an improvement in all the other symptoms—the red cells and the hemoglobin increase, the spleen becomes softer and smaller (often quite rapidly), the toxic symptoms disappear and the patient is in every way greatly improved. Just how long the effect of the treatment lasts and what its exact value is in relation to the other methods is rather difficult to state at this early date. The longest period over which the blood-picture has remained normal, after the discontinuance of benzol, has been three months. In other cases the white count has commenced to rise rather promptly after stopping the treatment.

There are certain points wherein this method deserves to be watched closely. Several acute exacerbations, following the initial beneficial results, have been promptly followed by death. As with the x -ray all cases do not react with equal benefit. The drug is, moreover, rather difficult to administer, giving rise, in a large number of cases, to epigastric burning, disagreeable belching, and occasionally to headache and vertigo. The first of these symptoms may often be obviated by administering the drug in gelatine capsules with equal parts of olive oil, or in milk, or probably better still, in the hardened gelatine capsules now put on the market under the name of Gelodurat Capsules. It has also been administered hypodermically with good results. The dosage is a matter of considerable dispute, some of the arguments being perhaps purely theoretical and not borne out in practice. The most general practice is to give the drug in doses of 3 to 4 gm. a day, beginning with the smaller dose and increasing it if necessary. As to its relation to the x -ray treatment and whether it should supplant that method, it is yet too early to give a definite answer; but results would tend to show—and Koranyi himself recommends this—that it should be used, not as a substitute for, but as an adjuvant to, the x -ray treatment. Its effects do not seem to be as lasting as the x -ray; and, strange to say, the most brilliant results with the benzol treatment have been obtained just in those cases which had become refractory to the x -ray. Moreover, there are localities in which the x -ray is not accessible, and in such cases the benzol treatment is invaluable. But when the x -ray can be used it seems the best practice to rely mainly upon it, using the benzol cautiously, according to indications.

We cannot close this review without calling attention to another method of treatment which has met with considerable success in the few cases in which it has been tried. It would seem rather irrelevant to mention

in the JOURNAL a drug which probably very few of us have seen or will have the opportunity of using in the very near future. Thorium-X, a radio-active substance, has been used with good results in a few cases of leukemia. In 4 of 6 cases reported by Falta the blood-picture returned to normal, with improvement of the other symptoms. Others have reported encouraging results with the method, but the time has been too short and the means for using the method too inaccessible for any conclusions to be reached that are of practical value.

DIAGNOSTIC AND THERAPEUTIC NOTES.

AIR IN THE ABDOMINAL CAVITY AFTER LAPAROTOMIES.—Cohn (*Deutsch. med. Wochenschr.*, No. 25, 1913). At a recent meeting of the Berlin Medical Society, Cohn reported some interesting observations regarding air in the abdominal cavity. Systematic roentgenological studies showed that, after laparotomies, more or less air always remained in the abdomen. If the wound was sewed up, with the patient in the horizontal posture, the amount of air included was usually small. The greater the elevation of the pelvis and the more the wound was allowed to gape, the greater the amount of air remaining in the peritoneal cavity. After the abdomen has been closed, the location of the air within the peritoneal space is dependent upon the position of the patient, tending always to seek the highest levels. The air bacteria seem to be harmless and ill effects are produced only by the pressure of the included air upon the diaphragm and the bowels. Clinically, the presence of considerable air in the peritoneal space closely resembles meteorism, and surgeons must remember that not every post-operative tympany is due to relaxed bowels. The air is completely absorbed in from eight to fourteen days.

MORE ABOUT BENZOL.—Királyfi (*Wien. klin. Wochenschr.*, No. 26, 1913.) The writer reports some further results of the benzol therapy from v. Koranyi's clinic. Like that of the x -rays, the therapeutic value of benzol is most marked in lymphatic leukemia, less so in lymphosarcoma, unsatisfactory in myelogenous leukemia. It is entirely ineffectual in Banti's disease. In one case of leukemia, the white-cell count fell rapidly and continued to fall after the benzol was discontinued. Some days later an intractable epistaxis set in which ended in the patient's death, twenty-two days after the discontinuance of the benzol. As this was probably due to an after-effect of the benzol, the rule has been established, in Koranyi's clinic, to discontinue the drug when the leucocyte count has reached 25,000-20,000, or even earlier if the fall in the count is very rapid.

In another instructive case, the benzol treatment resulted in a satisfactory improvement which persisted during an intercurrent pregnancy. After labor, however, the patient quickly relapsed to her initial condition. All the cases hitherto observed indicate that the best results are obtained by alternate benzol and x -ray treatment. When the benzol is not well borne by the stomach, it may be administered per rectum.

HEREDITY AND TUBERCULOSIS.—Kuthy (*Zeitschr. fuer Tuberk.*, Vol. 20, No. 1). In an interesting article, Kuthy discusses the importance of heredity in the production of tuberculosis. His observations lead him to conclusions different from those in general vogue. So far from regard-

ing the offspring of tuberculous parents as predisposed to the disease, he finds that these children show evidence of a relative immunity to tuberculosis, so that, if infected, the disease tends in them to run a benign course.

THE GUINEA-PIG TEST FOR TUBERCLE BACILLI.—Bauereisen (*Zentralbl. fuer Gyn.*, No. 23, 1913). The difficulty of demonstrating tubercle bacilli in the urine is well known and the objection to the guinea-pig test is the length of the interval that must be allowed to elapse before it can be definitely determined whether the inoculated animals are tuberculous or not. This interval can be greatly shortened by the following procedure. The sediment of the suspected urine is injected hypodermically into a guinea-pig. Two or, at most, three weeks later, a very dilute solution of tuberculin (1:10,000 to 1:50,000) is injected into the animal intracutaneously. A positive reaction shows that the animal has become tuberculous as the result of the urinary inoculation, a negative one that it has not.

POWDERED SUGAR IN INOPERABLE CANCER OF THE CERVIX.—Berczeller (*Zentralbl. fuer Gyn.*, No. 23, 1913). The cleansing action of sugar on gangrenous wounds has often been noted. The author has obtained especially satisfactory results in inoperable, ulcerating cancers of the cervix. Through a speculum the necrotic surfaces are cleaned and thickly covered with powdered sugar. The results are often striking: The discharge diminishes, the odor disappears, the gangrenous surfaces are cleansed and sometimes the improvement is so great as almost to simulate a cure. The application must be repeated daily.

ROENTGEN THERAPY IN PERITONEAL TUBERCULOSIS.—Holzbach (*Muench. med. Wochenschr.*, No. 25, 1913). At the last meeting of the German Gynecological Society, Holzbach reported good results from x-ray therapy in tuberculosis of the peritoneum and of the female genitalia. Large doses of the rays must be given, well filtered through aluminum sheets. Cases of tuberculous peritonitis, with much fever, received an intraperitoneal injection of iodoform oil, before being exposed to the rays. The latter slowly set free iodine from the iodoform and thereby apparently exerted a strongly favorable influence upon the morbid process.

CHRONIC ARTHRITIS.—Jones (*British Med. Journ.*, May 17th, 1913.) The general tendency to consider chronic arthritis as of a cryptogenetic infectious origin finds support in the therapeutic experience of Carmalt Jones. Twenty consecutive cases are reported which clinically suggested a streptococcic origin, although the bacteriological examination was negative. The cases were, in the majority of instances, of long standing; they had resisted general therapeutic measures; and no source of infection was clearly indicated. Effusion into joints was rare, and the fluid when removed by puncture was invariably sterile. Blood-cultures were also sterile

whenever investigated. For various reasons streptococcal infections were suspected, and the patients were accordingly treated with vaccines made from streptococci obtained either from the mouth, in cases of oral sepsis, from the urine, or from the feces. Eight out of 20 unselected cases gave strong therapeutic evidence that their arthritis was due to infection by streptococci chiefly derived from some part of the alimentary tract.

A SIMPLE TREATMENT OF BRONCHIAL ASTHMA.—Gruenwald (*Munch. med. Wochenschr.*, No. 25, 1913). By means of a laryngeal syringe, 1 c. cm. of a 1:10,000 solution of suprarenin (adrenalin) is injected through the glottis into the trachea. The patient immediately feels a sensation of cold, extending down into the epigastrium, and, soon after, the respiration becomes less difficult. A single injection apparently suffices to abort the attack, and indeed, in the writer's experience, to prevent its recurrence for several months. The treatment is most successful in the so-called idiopathic bronchial asthma; it fails in reflex asthmatic attacks and in the asthma of hay-fever.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

On July the 16th and 17th, there was held, in London, the annual meeting of the Medico-Psychological Association, of Great Britain and Ireland, a society whose ranks are, as perhaps the name implies, recruited from those concerned with the practice of what, by an etymological and cacophonous barbarity, is now called psychiatry.

The Association has, however, many-sided activities: it conducts debates of the greatest weight and moment; it is responsible for the production of the *Journal of Mental Science*; it grants, after examination, a special diploma to medical men emulous of distinction in their special field; and it takes an active part in promoting the diffusion of accomplishment and knowledge amongst the deserving class of asylum attendants. Moreover, while it affords opportunity for the discussion and resolution of the many difficult problems that vex the souls of those who have control of institutions for the reception of those mentally afflicted, it has taken, and doubtless will take, increasingly, an honorable and laborious part in assisting the passage of various legislative efforts through Parliament; and is recognized as the premier unofficial authority to be consulted, on behalf of the State, in matters pertaining to Lunacy and Lunacy Administration. The President for the ensuing year is Dr. James Chambers, of Roehampton, Lecturer on Mental Diseases at the Middlesex Hospital Medical School; and the address which he delivered, on assuming the chair, is one of considerable interest, not merely to psychiatrists, but to all physicians who recognize the importance of the application, as in the study of medicine, of the teachings of biology and philosophy. It will appear in the *Journal of Mental Science*, for October next, under the title of "The Prevention of the Insanities."

It was said, at the outset, that while we are wholly in agreement that the duty of the physician is not merely to cure, but to prevent, and to use his knowledge to such purpose that those who direct the affairs of State may be properly and adequately informed in respect of all matters pertaining to prophylaxis, yet we are less in concert as to how disease in general, and the insanities in particular, are to be prevented, without interference with those conservative and even stimulating factors that are so intimately connected with those others that are indubitably provocative of evil.

Dr. Chambers, after insisting on the need for recognition of the infinite complexity of the causal nexus in so many cases of mental disease, went on to point out how Hobhouse, in a recent work, has elaborated the thesis that in the development of mind we have to reckon with a category of causation that is other than mechanistic. This teleological category

Hobhouse finds to involve what he calls 'conditioned purpose.' Dr. Chambers showed how far this position assumed by Hobhouse, even if it does not convey suggestions of design, approximates to that adopted by the famous author of the "Analogy of Nature"; and went on to draw an interesting parallel between the thoughts of Butler in respect of the moral evils with which the world is beset, and those of Mongour, of Bordeaux, who finds in tuberculosis a selective agency, provocative of response on the part of those who can respond, and eliminative of those without such capacity for due response.

The teleological explanation was then shown to apply also in the world explored by the biologists, as a result of the labors of those, who like Adami and others have found in Hormonism a formula which revives Lamarckism and reconciles the continuity of the germ-plasm with the transmission of certain acquired characters; and it was argued, with some ingenuity, that the factor of purposive response to stimulus is as generally present in the processes leading to physical development, as Hobhouse finds it to be in those of mental growth, and as we all find it in those of such active immunization as occurs during disease.

Under these circumstances it was natural for Dr. Chambers to insist that reliance on personal effort is, both for the individual and for the race, far more valuable than abject acquiescence in doctrines that would relegate us to the position of mere shuttlecocks at the disposal of cosmic forces.

Passing then to a consideration of such measures as have been proposed in the endeavor to secure betterment of the race, Dr. Chambers pointed out the more or less innate tendencies of all of us to lean towards one or other school of thought; and showed how necessary it is that our plans for future action should be formulated in the light of past experience, making, in this connection, some interesting observations on the effect of the caste system in maintaining certain types of efficiency.

The individual was then considered; first, as progenitor—a mere shell or husk for unmodifiable germ-plasm, amenable only to the laws of Mendelians, mutationists, and their like; secondly, as parent of a germ-plasm that, though continuous with the ancestral germ-plasm, is nevertheless modifiable in the manner shown us by the neo-Lamarckians, by means of hormones and such bodies; and, lastly, as the social unit, to whom either legislation or self-restraint denies the lawful occasion for propagation.

Dr. Chambers, taking a broad view, rapidly traced the extent to which each of these points of view are substantive, emphasizing, in every paragraph, the burden of personal responsibility and the need for personal effort.

He showed us, too, how the unexplained ethical process of Huxley has appeared again as the orthogenic evolution of Hobhouse and of Sutherland; though, this time, on a rational basis as an expression of that ordered process by virtue of which alone man has become what he is, and by which he will progress yet further towards the accomplishment of his destiny. The practical lesson to us, as everyday physicians concerned with the prevention of mental and physical disease, is that just as the skilled vaccinist utilizes the toxic properties of his cultures to evoke a happy response from such patients as are susceptible of response, so must we not so much aim at any Utopian abolition of everything that is hurtful or unpleasant, but at the overcoming of evil, and at the further education of the mind and body through defensive response to the stimulus of difficulties. Yet, while this should be our aim in respect of

those who, as has been said, are susceptible of response, our duty in the field of psychiatry towards those who are incapable of response is no less urgent than is the need for appropriate care of those for whom, smitten with tuberculosis, there is no hope of improvement by the use of tuberculins. And, in care for these unfortunate 'unimprovable' we find a duty which we cannot neglect without failing to participate in that advance of humanity that requires, and is indeed founded on, love for others, and which has taken the place of the lower instincts of self-preservation and self-interest.

The address from which I have quoted so freely is full of material for discussion, but Americans may be interested to know that due credit was given Oliver Wendell Holmes for having, long ago, in one of the chapters of the "Autocrat," charmingly expressed a great deal of the Freudian philosophy in a few lines of poetic prose. I forbear from giving the exact reference in order that any of your readers to whom the passage is unfamiliar may have the pleasure of remaking the little discovery for themselves.

Dr. Chambers' address, catholic in its outlook, yet conservative in its tendencies, may perhaps be accepted as typical of the attitude assumed by the cultured and yet practical British physician of mature experience in the face of problems of life and disease. An address that I heard last night from the lips of Prof. Jung, of Zurich, at a meeting of the Psycho-Medical Society, was no less notable, however, although in many respects in strong contrast to that delivered by Dr. Chambers. Yet, after all, there was little save merely verbal difference between the perorations of both speakers; for Prof. Jung found the lesson to be drawn from his examination of his subject to be this: that the neurotic is to be helped only by inducing him to "assist in carrying on the task of civilization";—by teaching him that no reward accrues save as a result of duty fearlessly performed, of victory over difficulties and of suffering sustained. For the tortured soul of the neurotic there is no peace and comfort save that won as the reward of a life actively spent in the service of others. Yet what was Prof. Jung's text? He, as all the world knows, is one of the ablest exponents of the theory and practice of psychoanalysis; and, although a follower and an admirer of Freud, differs from that great man, and has founded an independent school of thought.

Prof. Jung is less confident in tracing sexual origins than is Freud; he is less certain of the extent to which the Freudian interpretation of symbols can be carried; and he is far less eager to assert that repressed desire—the 'wish-fulfilment' motive—is lurking in the background of every neurosis, and behind every dream.

Prof. Jung commenced his discourse, which was delivered in excellent English, by emphasizing the technical side of psychoanalysis. He insisted, too, that not merely the technical methods, but the principles underlying these methods must be understood before practical results can be obtained. Psychoanalysis is something far more than mere anamnesis; something different from mere suggestion. If it is to be practised successfully, there must be no arbitrary interpretation; and nothing must be forced. The patient must be led to a knowledge of his own self; he must be convinced of the nature of his illness, and of its true content. The end then, or, if we will, the cure, "comes with the formulation of the unsolvable problem" that is at once the true source and meaning of the illness. But the doctor must be sure of himself, and of his own mind before he sets to work to find the clue to the mental tracts that, in his patient's

mind, are overlaid by consciousness. The patient must then be induced to speak freely of what occurs to him, and, if there be resistance, more elaborate methods involving the analysis of dreams must be employed. In this connotation an interesting suggestion was made, to the effect that opposition to dream analysis, on the part of many people, is due to the actual fear we entertain of those superstitions that the race has so recently overcome.

In dealing with the actual interpretation of dreams, by the analyst, Prof. Jung insisted that the principles of dream-study are not really new, and he laid stress on the relation of dream-parts to experiences in recent working life.

Running through this portion of his address there was manifest a strong tendency to explain many parts and qualities of dreams by reference to stages in the evolution of the race.

Thus he pointed out that in an early stage of human development it was customary to elucidate the unknown by reference to the known, in the same way that the aborigines of America regarded the first horses they saw as huge pigs. In this way much of the symbolism of the early peoples, advancing rapidly in thought, is to be explained; and one of our tasks in healing the neurotic or psychasthenic is to induce him to advance by taking hold of this purposeful intent of symbolism, just as did his prehistoric progenitors; finally, as do the highest products of civilization, laying this symbolism on one side.

Again, the psychasthenic, in using symbolism as a means of advance, must, as Prof. Jung said, reassume the attitude which in earlier individual and racial-life involved the acceptance of dogma. And the doctor, too, in dealing with the psychasthenic must never allow himself to argue with the patient, for argumentation involves loss of influence.

The keynote of Prof. Jung's address, as of Dr. Chambers', was this: That purposive effort is required in the form of stimulus from the healer and of response from the patient. It is through the personal effort of the individual, in response to environment, that the race has progressed, and it is through the personal response of the patient to stimulus from another that alone can disorganized mentality be rearranged. Indeed, the essence of the therapeutic effect of psychoanalysis is reconstructive in Prof. Jung's view, rather than surgical, as in Freud's. At any rate, such are the impressions left on my mind by a very fascinating lecture. The remarks of Prof. Jung were vastly appreciated, and were listened to with sustained interest which was also extended to the capital debate that followed, in which Dr. Eder, who in London is one of the best known as well as one of the most earnest exponents of the Freudian philosophy, took a vigorous and informing part.

August 10th.

PRACTICAL MEMORANDA.

By WILLIAM T. COUGHLIN, M. D., of St. Louis.

To sustain the nutrition of a patient in a case of protracted vomiting is often very difficult. The cause of the vomiting is not always easy to find and even when found not always quickly removable, and in the meantime the patient must be nourished. Of course, one at once thinks 'feed per rectum.' But the ordinary methods of feeding per rectum are, when carried on for more than a day or two, quite unsatisfactory and usually become impracticable.

Doctor Louis H. Hempelmann, of St. Louis, has had recourse to a method by means of which rectal feeding can be continued for a remarkably long time without any unpleasant effects and with satisfaction and benefit to the patient. The method consists in instilling by the drop method a solution of glucose in saline or even in plain water. If the procedure is to be kept up for any length of time it is perhaps better to use plain boiled water delivered to the rectum at a temperature not lower than 104° F. The solution is allowed to flow at the rate of 45 to 60 minims per minute for three-hour intervals with one- or two-hour rests. The following is the formula:—

Glucose 3 to 4 oz. in normal saline, one pint. It may be given in sterile water instead of normal saline, or cane sugar may, in case of necessity, be used instead of glucose.

To arrange a fixation apparatus for a high fracture of the thigh in an infant is a problem. We are advised to suspend the lower limbs of the infant by the feet. When this is done the child cannot be nursed and this is a decided disadvantage.

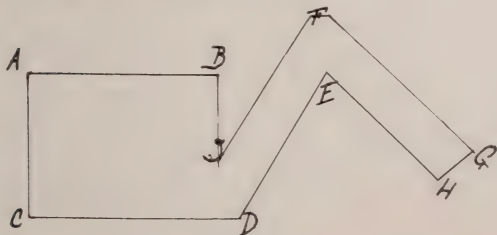


Fig. 1.

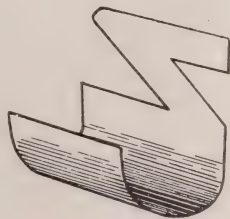


Fig. 2.

Fig. 1.—The figure is the shape cut from galvanized iron. AB is the length of the distance from one anterior spine to the other, measured around the back. CD is as long as the distance around the buttocks from one trochanter to the other—legs extended. DE is as long as the distance from the tuber ischii to the flexure fold of knee. FG is the length of the distance from the knee-cap to the sole. All measurements are made on the sound limb.

Fig. 2.—The splint as it appears when bent to fit the pelvis and buttocks of the baby before being padded.

Doctor V. P. Blair, of St. Louis, has devised a splint (Figs. 1 and 2) which recently proved its usefulness in a fracture in the upper third of the shaft where redisplacement followed all attempts at reduction and retention. The splint was cut from light galvanized sheet iron in the shape shown in Fig. 1. The angle BIF is to be the angle made by the sound thigh with the axis of the body in flexion of the thigh. The arm IDEF is as long as the thigh and the arm EFGH is as long as the leg. After cutting, bend the body of the splint ACBD so as to come up around the sides of the pelvis and body of the baby while the baby lies on it with the injured limb toward the arm side of the splint. Pad all normal hollows to protect bony prominences. The leg of the injured side is flexed, and then the thigh; and while traction is maintained both thigh and leg are bound to the arm of the splint and a few turns of a bandage around the body fix the pelvis of the baby in the splint. The baby may be allowed to lie in any position or may be carefully carried by the nurse.

Gayet and Norot have recently experimented to determine the value of the sterilization of rubber catheters by formol vapor, both hot and cold. The bacteria used were the streptococcus, *B. coli communis*, *B. pyocyaneus* and *B. tuberculosis*. They conclude that the temperature of the vapor makes little or no difference, that the duration of the contact is the important factor, and that if a rubber catheter has been used on a very septic case it is much better to throw it away than to attempt to sterilize it by this means.

The general practitioner is seldom called on to treat urticaria until the patient has exhausted the list of household remedies; hence, few patients are more grateful than those successfully treated.

The very first indication is to relieve the itching and burning; the second to find, if possible, the cause; and the third to employ prophylactic measures for prevention of recurrence. To relieve the itching both lotions and powders are used either singly or together. As lotions the best are either a 1 per cent. carbolic solution in hot water, to which has been added 25 per cent. glycerine, or one of hot water containing 33 per cent. vinegar. These are mopped on and while drying the surface is powdered, either with fresh starch, subnitrate of bismuth or oxide of zinc containing 2 per cent. menthol or camphor. Internally one may give valerian. The bromides and chloral may make matters worse, as their use often produces urticaria.

The cause is often due to digestive disturbances; if so, a dose of castor-oil followed by a bland diet will do good. Certain kinds of food, *e. g.*, fish and certain fruits, are often provocative of an attack. If such be the case, the patient should be warned to avoid them.

BOOK REVIEWS.

THE CATARRHAL AND SUPPURATIVE DISEASES OF THE ACCESSORY SINUSES OF THE NOSE. By Ross Hall Skillern, M. D., Professor of Laryngology in the Medico-Chirurgical College; Laryngologist to the Rush Hospital, etc. etc. London and Philadelphia: J. B. Lippincott Company. 1913. Price, \$5.00.

American and English readers are to be congratulated on the fact that at last there has appeared in their own language so worthy a book on this subject. As stated by the author in his preface, "the inspiration of the work has been to set forth in the English language a thorough and exclusive treatment of this subject." Those who have followed Skillern's work through recent years will at once appreciate his special fitness for the task which he has undertaken. To undertake the publishing of any medical textbook must in these days indeed require no small degree of temerity. Skillern has fortunately chosen a field in which a work like the present one is sorely needed and whose advent should be hailed with appreciative recognition both by the English and the German speaking public.

Outside the well-known classic of Hajek we know of no other text on this special and important subject. Skillern's work certainly contains all the excellences of its predecessor, as well as much that is new and vital. To mention all its commendable qualities would be impossible in a brief review, and we must confine ourselves to a few of the more striking ones. One of the most conspicuous of these is the comprehensive and exhaustive reference to the literature of the various subjects discussed. As in Zarniko, so here the references are given at the bottom of the page corresponding to the text to which they refer, rather than at the end of the book, as is the case with most of the older writers. The book is a veritable compend of the literature on the accessory sinuses up to the time of its publication. Whereas full notice is taken of German and French literature, the work surpasses many of the foreign works, most notably the German, in that ample reference is made to our own literature, which is both voluminous and worthy.

Another most notable point in the present work is the wealth and profusion of the illustrations, 247 in all, with five colored plates. With few exceptions these illustrations are original and are made from specimens in the author's well-known collection, as well as from those to which he has had access. We regret, however, that reference to the various points of interest in each illustration has been made by letter, the text being given below rather than in the illustration itself. This method, to say the least, is antiquated and detracts from the facility and enjoyment of the reading.

For a first edition the book contains few typographical and other errors. Some of these, however, have crept in and will doubtless be remedied in future editions. Some sentences, at present a trifle ambiguous, could be improved by recasting, while the arrangement of the discussion in certain chapters would be made clearer by a more obvious grouping under main and subheads. Such defects are, however, minor in a work of such uniform excellence. It is certainly a credit to scientific medicine, as well as to the American profession, and should be in the possession of every rhinologist of the present day.

DIABETES: ITS PATHOLOGICAL PHYSIOLOGY. By John J. R. Macleod, M. B., Ch. B., D. P. H., Professor of Physiology, Western Reserve University, Cleveland, Ohio, etc. etc. New York and London: Longmans, Green and Company. 1913. Price, \$3.00.

In the author's preface we read: "For those who cannot find time to do this [experimental work] it is hoped that the following pages may serve as a useful review of a part of the work that has recently been done"; and indeed we found in the 220 odd pages an exceedingly useful review as well as much that was new.

It appears that almost every conceivable phase of sugar production, assimilation, distribution, formation, excretion, in fact, every possible concept of metabolism of sugar is herein set forth.

The nervous mechanism, the ductless glands, the enzymes, hormones, every

factor that might be concerned with sugar—physiological, pathological, experimental and clinical—is diligently and with painstaking exactness set clearly forth. For the physician who would keep in touch with the latest literature, the book commends itself worthily.

DER GEBURTENRUECKGANG IN DEUTSCHLAND. Seine Bewertung und Bekaempfung. Auf Grund amtlichen und ausseramtlichen Materials. Mit Genehmigung des Herrn Ministers des Innern erfolgter, erweiterter Nachdruck aus den "Veroeffentlichungen aus dem Gebiete der Medizinalverwaltung." Heft 13. Von Dr. J. Borntraeger, Regierungs- und Medizinalrat in Duesseldorf. Wuerzburg: Curt Kabitzsch. 1913. Price, 4 m.

No more exhaustive study of all the factors explaining the constantly decreasing birth-rate has ever before been presented. While taking up only conditions in Germany, this volume will nevertheless prove of interest and value to any student of this problem, since a perusal of the volume rather convincingly shows that the causative principles of reduced fertility are approximately the same the world over. As regards the suggested remedies which the author advocates, including, *e. g.*, suppression of all attempts on the part of women to attain equality, etc., it would be superfluous to state that the American reader will hardly feel inclined to grant him his full concurrence.

BOVINE TUBERCULOSIS AND ITS CONTROL. By Veranus Alva Moore, B. S., M. D., V. M. D., Professor of Comparative Pathology, Bacteriology and Meat Inspection. New York State Veterinary College at Cornell University, etc. Thirty Full Page Illustrations. Ithaca, N. Y.: Carpenter and Company. 1913. Price, \$2.00.

As a summary and discussion of our knowledge of its subject, this book is entirely admirable in nearly every detail.

The history, importance, etiology, pathology, symptomatology, dissemination, diagnosis, treatment and control of the disease are fully considered. The carefulness and thoroughness with which the subject matter is handled and the various aspects of the problem studied render the volume one of exceeding value. It were almost invidious to pick out one chapter from the others for special praise, but chapter XI on The Control of Bovine Tuberculosis seems to the writer to be a model of its kind. The volume deserves to become a standard work upon its subject. There are thirty full page illustrations from photographs.

SAFEGUARDING THE SPECIAL SENSES. General Advice Regarding the Use and Preservation of the Eyes, Ears, Nose, and Throat. By Henry O. Reik, M. D., Formerly Associate in Ophthalmology and Otology in the Johns Hopkins University and Surgeon in the Baltimore Eye, Ear and Throat Hospital, Baltimore, Maryland. Illustrated. Philadelphia: F. A. Davis Company. 1912. Price, 75 cents.

This is a most readable little book and withal contains a vast amount of very useful information. To the mother interested in the welfare of her children it should prove as valuable in its especial field as Holt's "Care and Feeding of Infants and Children." Fortunately, there seems to be less and less disposition at present to disregard difficulties pertaining to the special senses; hence, it may be said, without doing the author an injustice, the book is perhaps preaching a sermon which is already fairly well known.

CHLORIDE OF LIME IN SANITATION. By Albert H. Hooker, Technical Director, Hooker Electrochemical Company. New York: John Wiley and Sons. 1913.

While written from a commercial point of view, this work is of distinct value to the student of sanitation. The application of chloride of lime to water purification, street cleaning, and in connection with the handling of infectious diseases, is carefully summarized. A valuable feature of the work is the extensive bibliography which is not simply a list of titles, but which consists of abstracts and summaries of books and articles on the subject.

OBSTETRIC AND GYNECOLOGIC NURSING. By Edward P. Davis, A. M., M. D., Professor of Obstetrics in the Jefferson Medical College, Philadelphia, etc. etc. Fourth Edition, Thoroughly Revised. Philadelphia and London: W. B. Saunders Company. 1913. Price, \$1.75.

A thorough revision of the text and many additions have greatly increased the value of this excellent little volume in its fourth edition.

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EDITORIAL.

WHAT IS OR ARE EUGENICS?

In a rather clever novel by Ian Hay, which bears the buoyant title "Happy-Go-Lucky," the following significant conversation takes place. " 'Tiny, my bonny boy,' he enquired of me one morning after breakfast, 'do you happen to have any sort of notion what Eugenics is—or are?' 'I believe,' I replied hazily, 'that it is some sort of scheme for improving the physique of the race.' Dicky nodded appreciatively. 'I see,' he said. 'One of old Sandow's schemes. His name is Eugen. That is better than I thought. I was afraid it was going to be another kind of political economy.' "

Without subscribing completely to the truthfulness of the foregoing ideas, may it not be asked in all humility, Where is or are eugenics going to end? If one reads Géza von Hoffmann's recent book, "Die Rassenhygiene in den Vereinigten Staaten von Nordamerika" (J. F. Lehmann, Munich), with that degree of intelligence which it deserves, and if, after closing it, one cogitates over its contents, can one's conclusions be other than that the science of eugenics is a very mischievous matter at present—that is, as conceived by the enthusiasts who with their half-baked ideas have been instrumental in passing laws in many of our States—with every promise that its prosecution in the future will make the happenings of to-day seem by comparison a puerile effort at tentative measures? Surely not, for are we not already sterilizing the unfit in some fourteen States, and if this is done to-day, what with the science of eugenics still in its swaddling clothes, will not the future write in much larger letters our direful "wholesale tampering with the structure of the population," to use Professor Bateson's significant words from his Address on Heredity delivered at the Seventeenth International Congress of

Medicine? Now, without being alarmists and always hopeful that reformers will see the errors of their ways, especially after they have rushed blindfolded into a matter that has caught their fancy but not their deeper intelligence, it would seem that the times are ripe to put a few questions to our reformers in the hope of ascertaining just what, in their present state of intelligence, constitutes that badge of infamy which confers on the individual his title to being considered that appalling derelict of modern society—an 'unfit.' According to the intellectual (?) wave that must have deluged Iowa ere its eugenical law was passed, an 'unfit' is a person of either sex who is either an idiot, a drunkard, a narcotist, an epileptic, a syphilitic, a prostitute, or a unit in the province of the feeble-minded. Of course, by 'unfit' is not meant that he or she is an undesirable companion, one to be shunned in true Anglo-Saxon fashion, to be received with the finger of scorn as did our enlightened ancestors, when, in their righteous indignation, they were at times compelled to sit in the most democratic of all American institutions—the street car—next to a prostitute, a drunkard, or a narcotist. That sort of deplorable attitude toward those who do not live our correct lives would to-day be considered too feeble an effort at reform, in fact, declarative not only of a deprecatory tolerance, but of so great a lack of interest in the future of the human family that the person guilty of the old-fashioned protest, if really found out by the eugenists, would receive some very harsh criticism. What he should do, if we have read the literature on the subject correctly or understood the frenetic spoutings of our eugenical friends—eugenical in arranging other persons' lives but not their own—is to make a note of the number of derelicts he has come across, fortify his knowledge with their respective house numbers, visit them in kindness, but ever with the eugenical eye on the alert, and, when quite positive that a person is unfit to be the progenitor or progenitress of children, turn him or her over to the tender mercies of the invokers of the Law for Doing Away with Future Degenerate Children, and have the sexual organs emasculated! Could simplicity go any further and the interference with personal rights in a republican form of government be better exemplified than by this procedure, which has all the beauty and glamor of Louis XIV's famous saying: "The State, it is I."

But to return to our muttons, what is an 'unfit' or, to be a better grammarian, who are the 'unfit'? Let us suppose that the man or woman upon whom we have fastened our eugenical eye, in the hope of protecting the future of the race, is not such a bad lot as our present frenzy on the subject of eugenics makes him or her out to be,—would not our insistence for either to come under the ban be attended later on by some remorse

on our part? Can we be sure that their children will turn out to be so undesirable that they will be simply refuse in our triumphant civilization? If we knew the inscrutable laws of Nature—and, though we may think we are intellectual giants, let us record here without trying to insult mankind that, when it is a question of the secret workings of Nature, we are, alas! only too often pigmies—there might be some justification; but our present state of ignorance being no better or worse than it was in the past, the realization must be ours that there are some things that even we Americans will never understand. And in making this statement we have not overlooked the much-exploited book on the Jukes family, that fearsome record of crime, pauperism, disease and heredity, nor have we forgotten a matter of much greater importance from our point of view—the decided defects in the character of the ancestress of Jonathan Edwards.

The subject of personal rights should be a very important matter to every individual; and while it might be considered a bit socialistic for us to write that a narcotist, a drunkard, or a prostitute has certain rights, even though under great pressure we may say that in the early months of a syphilitic infection the individual has no further rights than to live the life of an outcast, yet we are firm in the belief that personal rights should be treated both by individuals and by the State with the greatest respect and consideration. There are circumstances, as all medical men know, when their advice, if followed with intelligence, can lead to considerable happiness though not to the complete routing of wretchedness; but this advice never partakes of that interference with the individual's life, which our various States are effecting when they boldly grind the sexual organs, or rather those parts which make for fertility, under the Juggernaut of their medieval frenzy. So again we ask, What is or are eugenics?

OPINION AND CRITICISM.

DOES NATURAL EDUCATION SPELL ANARCHY?

The name of Dr. Maria Montessori is to-day so decidedly an integral part of our conversation, when the spirit moves us away from the subject of our own desires and ambitions into the hitherto neglected realm of the desires and ambitions of the very young, that to be ignorant of the mission of this reformer is at once thought to be a defect in one's education. This attitude, on the part of the discerning, toward those who can but vaguely recall what Dr. Montessori's teachings stand for, or toward those who may admit that somewhere in their readings they came across her name but did not think it worth while to bother about her theories, has its justification; for it cannot be disputed that if one has been thoroughly inducted into her educational methods, the worth of her elaboration of the ideas of Rousseau, Pestalozzi and Froebel is striking, indeed. But even granting that medical readers, who have been more or less interested in this latest educational movement, have really done more than skim along the surface of her theories, have, in fact, taken the time to read with some attention "The Montessori Method" by Dr. Montessori herself,—are other books on the subject as interpreted by her disciples of so negligible a value that they can be overlooked by the reader without considerable loss of a proper understanding of the beginning and final fruition of her endeavors? Surely not, if we are to judge all others by the book which has recently come to our desk—"A Guide to the Montessori Method"* by Ellen Yale Stevens.

In this little work of some 240 pages there is the interpretative spirit that betokens not only the gift of seeing clearly, but the sort of mind that can take an involved problem and simplify it without damaging its worth and value. This, it must be admitted, is no mean quality in a writer, and that Miss Stevens has succeeded along these lines is greatly to her credit and quite a boon to those readers of the original Montessori book who were a bit baffled by theory at heels with theory, not so much on account of obscurities in the text, but because the subject was unfamiliar to them. But criticism of this sort cannot possibly be visited upon this book, for every page bears witness to the fact that it is the authoress' desire to unravel the knots and snarls that were bound to appear in a book crammed as is Dr. Montessori's work with the sum total of her educational studies. Thus the matter of natural education becomes more and more engaging; the lack of discipline, which made us a bit

*New York: Frederick A. Stokes Company. 1913.

ensorious after our first reading of an educational method that seemed to be founded on too much liberty, is shown to be a figment that was fostered by our failure to understand; and the full worth of sensory education is made so clear that he must be a dullard who cannot grasp its *raison d' être* as a preliminary step to ideas, "from the concrete to the abstract, and on to association and generalisation." But let no one imagine that Dr. Montessori's "sense of values" and "the controlling principle of liberty for the child in the spontaneous manifestations of his activity, which is also a means of moral discipline," and the other theories she stands for go unchallenged, even when interpreted for the uninitiated mind by such lucid writers as Miss Stevens and others, for quite recently another writer, Helen Hester Colvill, in an article entitled "Anarchy" (*British Review*), says: "But it occurs to me that probably Dr. Montessori *wishes* to train up Anarchists. Anarchy, theoretically, is a perfect system. Like the children she describes in their class-room, the anarchist is to move through his world 'intelligently and gracefully, committing no rude or unkind act, voluntarily busy, a law unto himself, owning no master, no superior, no law.'" An extreme point of view, this, and one to ponder well, for the reason that the educational problem of to-day will assume thereby a newer reading among a certain class of people—a class that can see only anarchy in "education that is two-fold—biological and social." But even so, is it wrong to inject a degree of revolt into a reform to make it outstanding enough so that the thread-bareness of the older fabric may be seen with unmistakable clarity? If Dr. Montessori is an anarchist, intentional or unintentional, she is in very good company, indeed, since it cannot be doubted that in the educational world there are no names that stand higher than those of Rousseau, Pestalozzi and Froebel, though it must be admitted that when they first shot their luminous theories across the darkened world they too were denounced as anarchists by those whose purblindness was thought to be the synonym of respectability.

A BOOK WITH IDEAS.

One of the great questions of the day is the equality of the sexes, or rather the greatest question of the day if we are to draw our inference from the many books and articles on the subject. Many minds of exceptional worth, mostly feminine, to be sure, are teeming with this question and its solution, but there are also a goodly number of valiant males—valiant because they are not too shamefaced, as some of us would be, to be allied with this cause—who are quite enthusiastic on the subject of equal rights for women. Our medical press in its meagre attempts at some sort of explanation has been either so conservatively supine that to take note of what has been written by its contributors, in any serious sense, would be declarative of our firm belief in the almost medieval detachment of medicine from the currents of thought that encircle us to-day—and

surely modern medicine in its progress is no longer an advocate of detachment but rather of attachment; witness all those chapters which come under preventive medicine: state and personal hygiene, the control of social diseases, the matter of sex education—or has been so tremulous from fear that the propaganda of the woman movement means only fewer children, hence less work for the accoucheurs, that if any luminosity has been cast on the problem it has had the discouraging murkiness of a light seen through a glass darkly. Now it is a fact that the woman movement is not distantly connected with medicine in a number of its phases which are of paramount importance both to medicine and the movement, and that its propaganda embraces much more than the reduction of the birth-rate, if that is really one of its tenets or a probable outcome as conceived by the pessimistic medical mind. Nor is it a psychosis or hysteria; rather is it, when stripped of its militancy, a movement that has enough points of sanity to invite serious thought from all. But if there are those who are still obdurate to an appreciation of the intellectual phase of this movement—the freeing of the masculine mind of its incrustations and the feminine mind of its frivolities and narrownesses—let them turn, not to the garbled accounts in the newspapers or the screeds in the comic papers, but to a book that has recently been published—namely, “The Feminist Movement”* by Ethel Snowden.

As the wife of Philip Snowden, M. P., author of “Socialism and Syndicalism,” Mrs. Snowden has an associate who, while he may not be directly responsible for her sound judgment, her common sense, her directness of speech, is no doubt a factor and a very good one in the cultivation of these qualities. When we recall the balderdash that has recently been written on this vexed subject, not only by the opponents of the movement, but by some of its most ardent advocates, it is with a sense of relief that we read the measured words in which the authoress writes chapter after chapter with never a lapse in her earnestness or in her convincing presentation of the subject. All her points are well taken; in fact, so well, that we doubt whether the most prejudiced of the aforementioned writers for the medical press, who would study them with the leniency that one expects from an educated man, would have the temerity to continue to write his vapid essays. Of course, it should be understood at once that the feminist movement is not exactly like the woman suffrage movement, being more inclusive, and that it attaches just as much importance to a number of medicosocial subjects as it does to votes for women. In fact, if we have read this unusual little book with intelligence, the feminist movement should be exploited in the medical press, at least in that section of it that is open to new ideas. But let no medical journal not be warned at once that the burden of this book is, in Mrs. Snowden’s words—“For the woman as a human being, and not as an animal, the feminist demands opportunity and freedom.”

*London and Glasgow: Collins Clear-Type Press. 1913.

LITERARY NOTES.

Medical literature, as well as other forms of the art of writing, runs to fads at certain seasons of the year, or, better said, during periods varying from one to, say, five years; and, of all fads, the matter of old age and how to prevent it or accept it gracefully seems at present to be in the lead. There are reasons for this and very good ones; for even outside the usual reading public which a medical work is supposed to command directly it is taken off the press, there is the lay public already so well instructed in the matter of how to prevent being gorgonized into wrinkles, chronic indigestion and weakened mental powers, that it is forever clamoring for new material. But, be it said here, all the books on this vastly interesting subject are not of the same calibre, using this word in the sense of being machine-made and put on the market to catch the eager and insatiable eye of the general public; and of all recent publications it would be a wearisome search and a futile one to find a better book than "Old Age: Its Care and Treatment in Health and Disease" by Robert Saundby, M. D. Edin. (Longmans, Green and Company, New York; Edward Arnold, London). It may be asked, what does a reviewer mean when he writes the word 'better'? In the case of this book it can be said at once that the word 'better' applies principally to the author's sanity of outlook, to his culture, and to his mastery of those unities in writing which are largely instrumental in producing clarity, soberness, and a soundness of judgment that prevents the imagination from running amuck. Take, for instance, the introductory essay on *The Duration of Life* and read it carefully and in a mood receptive of finished thought; and what is the result? With the kindly feeling toward the reader that he is already satiated with theories that have left only a bemuddling of his brain, we can assure him that the result will be gratifying; for he will learn that, while the tribulations of old age may be ameliorated, there is really no such thing as a moulting with the aged that will be followed by a rejuvenescence similar to a lustration in Ponce de Leon's Fountain of Youth. And it is well that he should know this, since this sort of knowledge is just what he may need to give him the proper ballast when a new inrush of books on the same subject assails him. To illustrate the sober tenor of this book, as well as the complete understanding the author has in respect of the working-out of theories and advice—sometimes mere figments and again delusive on account of the thin veneer of science—the following may be quoted: "The popularity of Metchnikoff's theory is much more due to its being some sort of an explanation which suggests a prophylaxis than because of its soundness. His argument is that the colon in man is a useless organ, fulfilling no function of digestion or absorption which has developed in mammals as a reservoir 'to enable them to run for long distances without having to stand still for defecation,' although those mammals which seek safety in flight do not 'stand

still' to defecate. However, he goes on to say that in this reservoir microbes develop, and that the consequence of fecal retention is the production and absorption of fecal toxins, yet Schmidt and Strasburger have proved that the feces of constipated persons contain few microbes; nevertheless, he asserts that 'the cause of the evil is the multiplication of microbes in the contents of the large intestine' (pp. 68, 69), and, again, that 'it is a just inference that the duration of life of mammals had been notably shortened as a result of chronic poisoning from an abundant intestinal flora' (p. 72). There is no evidence that constipated persons live shorter lives than those who are not; women admittedly suffer more from constipation than men, yet Metchnikoff says (p. 4) that 'women live to a greater age than men.' "

It may be that there are moments in the life of the busy general practitioner when he hears more than even his strong nerves can stand about his patients' insides, when he is a bit tired of reading of other general practitioners' experiences with their patients' insides, as chronicled in medical journals in the hope of enlightening less acute brothers, when clever anecdotes are a balm after a hard day's work and kindly philosophy a stimulant that does not overexcite. We say 'it may be,' as if we doubted these occurrences; but it would have been far truer to have written that there are without doubt not moments, but at times a full hour, if not hours, when the overworked brain of the general practitioner would be all the better the next day for some diversion that is but partly supplied by the contents of the evening paper or of some second-rate novel. Granting that he is inclined toward diversion and that he has heard so much about his patients' insides during his working hours that his good humor has been taxed, there is no better book for him to turn to than the one which has lately reached us, and which instead of being deeply engrossed with the insides of man is an anecdotal account of his outsides. This book, the title of which runs "Our Outsides: and What They Betoken" (John Wright and Sons, Bristol, Eng.) is by a very delightful writer—Dr. W. T. Fernie, who has already made his mark as the sort of philosopher and essayist whose kindliness, sympathy and insight indicate a decided degree of geniality, and, above all, whose fund of knowledge as a collector and graceful dispenser of anecdote is written large in a number of books, especially in "Health to Date," published last year, and in which, by the way, he bade farewell to his public, pleading old age as an excuse for the discontinuance of his labors. But the book under consideration is evidence that he has reconsidered his 'farewell,' and well it is that he has, for even a cursory perusal will suffice to show that so good a writer has no right to deprive his readers of entertainment and instruction, unless there is a decided weakening of the mental powers, which, in Dr. Fernie's case, is as yet far from evident. What are our outsides, may well be asked by the uninitiated reader. To mention only a few, there

are the eyes, the nose, the hands, the hair, the feet; and what of these, may again be asked by the prospective reader. Of course, were the author of this book of the prosaic order that an unkind critic would call lowly, the hands and feet, as well as the nose, could be disposed of in very few words; but, being of an altogether different order, he has much to say about them and interweaves so many interesting anecdotes that the account is of great interest. But no one, unless he has perspicacity and is widely read and knows exactly how to fit anecdotes between wise and appropriate comment, could evolve from our outsides anything above banality, or write over sixty pages on the nose or make an interesting essay of the hair. And that Dr. Fernie has these enviable qualities in their best estate, his book attests on nearly every page. Verily, this is the book for the overworked and brain-fagged practitioner in his leisure moments, not because it will take him completely out of his *métier*, but because it will teach him certain—shall we say poetic—aspects of the outsides of man, which owing to his lack of imagination he has somehow overlooked.

Now that it is in the air to talk 'sex,' to write about the sexes from new and startling points of view, to take the young in hand when they are still little barbarians of ungrammatical speech and unspeakable manners with a mentality that is far behind the cogitative sort, and show them the light that must lead to the higher morality, it should not surprise any reviewer that there are going to be medical men from now on who will not confine their innermost thoughts on this alluring subject to the prosaic columns of the medical journals or to those 'mixed' audiences at the various meetings of our societies for social and moral prophylaxis, the members of which are always unsympathetically inclined toward each other. A case in point is the recently published volume of short stories, "Wayside Experiences" by C. Elton Blanchard, M. D. (Physicians Drug News Company, Newark, New Jersey), in which the author shows that he has not repressed any thoughts he may have on the sex question or the terrors which follow in the wake of sexual diseases. Candor of this sort should not be shocking; but, though the writer of these lines is far from being a prude, he must confess to having been decidedly shocked, albeit he was amused by the lack of literary style and the utter inability of the author to conceive and carry to a successful finish the plots of his 'sex' stories. In those not very distant days when the Anglo-Saxon was taught that repression was a virtue—the days before the Freudian theory of non-repression was exploited—we looked askance at certain French writers because they had the audacity to mention subjects which we had tabooed. And, even when the literary artist had the genius of a Zola, a Maupassant, a Baudelaire, a Balzac, or a Gautier, we did considerable coldshouldering and, so to speak, gathered our garments closer around us lest the mire would bespot them. But with the modern idea of sex in-

struction all this has been changed, in fact, to such an extent that those two delectable words—syphilis and gonorrhea—are an integral part of our daily conversations irrespective of the gender of our companions. Not even the most audacious French writer, when in full swing on sexual matters, thought of mentioning gonorrhea or syphilis with the nonchalance with which the writer of these stories indulges in, for even he, despite the Frenchman's proverbial love of truth, practised enough restraint to be artistic. Of course, these stories as literary efforts are of small moment, and moreover may be intended only for the medical public; but how are we going to keep them from those inquiring minds outside medicine who do not know good literature from the other brand and are quite well satisfied if a new thrill is given them? But, on second thought, they must be intended for the general public, since the object of all sex instruction is to enlighten the benighted, and surely no doctor is to-day so obfuscated that he does not know the sinuous and insidious actions of syphilis and gonorrhea.

Although there are more comprehensive books on the subject of radium than is "Radium: Its Production and Uses" by Sydney Fawns, F. G. S. (The Mining Journal, London), this little work answers a very good purpose, inasmuch as it brings out a number of interesting points which are either overlooked in the more pretentious medical books or are thought of such minor importance that mention is considered superfluous. Is it not a fact that although to-day in medical circles there is much talk about the therapy of radium, the process of its production is practically unknown, or, if known after a fashion, is not of that positive nature that would make enlightened conversation. Of course, it is widely known that Mme. Curie discovered radium, that pitchblende is its parent, so to speak, that this parent resides in the celebrated Joachimsthal mine in Bohemia, that it has wonderful radio-active qualities, and that to-day, counting all the radium in existence, there is about an ounce, with prices per grain that would seem stupendous even to the American multimillionaire. And as for its therapy, that too is known, especially to the readers of "Radiumtherapy" by Wickham and Degrais. But what is not so well known is the extraction of radium, the occurrences of radium ore, the radio-activity of the earth, sea, air and sun, chapters which are concisely written by the author with no attempt at imaginative writing, a great temptation, indeed, when dealing with so fascinating a subject. A serviceable book, this, with no literary frills or furbelows, but with that insight into the subject which answers all practical purposes.

ORIGINAL ARTICLES.

ON INSTRUCTION IN PUBLIC PREVENTIVE MEDICINE.

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Among the modern activities of society none are more conspicuous than those directed toward the conservation of national resources. Of these none is of such fundamental importance as the health of the people. While this fact has always been appreciated by those qualified to form an opinion, its general popular acceptance is a matter of but comparatively recent date.

This growth of interest in health questions may be attributed to two influences—namely, the profoundly impressive and important results of biological and medical research, and the persistent dissemination of information related to such results. The dissipation of the mystery that formerly surrounded diseases with which we are more or less familiar; the discovery of the underlying factors in the epidemic and endemic occurrence of disease; and the discovery of specific agents for the prevention and cure of disease constitute topics well calculated to fascinate. In consequence we have a public not only reasonably conscious of these advances and their meaning, but also eager to witness their utilization for its good. It is not surprising, therefore, that the layman, individually and collectively, is beginning to busy himself with the affairs of those officially responsible for the conservation of health. The result of such popular interest, and at times unofficial participation, has been to stimulate the officials, to lift them from the beaten track of routine, and to invite them into newer fields of inquiry and activity. Within only a few years our progressive health authorities have undergone a remarkable evolution in so far as the conception of their functions, powers and responsibilities are concerned. This attitude becomes strikingly manifest when we compare the aims, objects and needs of to-day with those of but a few years ago.

Formerly the problem was relatively simple, due in part to the limitations of trustworthy information. It comprehended, in the main, maritime quarantine against the introduction of dangerous diseases from without; the abatement of nuisances having a tendency to be prejudicial to health; the control, after a fashion, of epidemic diseases when they had advanced

to the point of epidemicity; the disposal of the dead after contagious diseases; and the compilation of vital statistics having to do principally with death- and birth-rates. The personnel of the health boards usually comprised earnest but untrained men, and the problems that presented were met to the best of their abilities as they arose. The conception of new problems; the expansion of the day's work; the encouragement of such penetrating activity as is to-day sometimes denominated 'meddlesome paternalism'; and the anticipation of troublous times to come were nowhere in evidence.

Compare this with the daily routine and the general conception of responsibility as evidenced by the best of our modern health organizations. Perhaps the first thing that strikes us is the common use made of methods of precision in the solution of everyday problems. The well-equipped and efficiently-manned laboratory is an indispensable part of the equipment. Not only are the trustworthy laboratory methods of diagnosis a matter of routine, but encouragement is given to the search for preventive and curative agents. The laboratories are called upon to determine the efficiency of manifold agents for the various purposes for which they are daily employed; to detect unlawful adulteration of foods; to control the character of water supplied for domestic use; to supply needed information concerning the public milk supplies; and to co-operate in all measures aimed to the securing of information applicable to the preservation of the public health. The preparation and testing of antitoxic sera; the preparation of bacterial vaccines; the diagnosis and prophylactic treatment of rabies and hydrophobia; the testing of disinfectants and the methods of using them serve as illustrations of some of the activities of our Board of Health Laboratories.

Systematic school inspection has become a routine factor in public preventive medicine. That it be effective demands of our health officials not only a knowledge of our school populations, but of the buildings occupied by them for a large part of each day. Those responsible should be familiar with the acute diseases of childhood, the means of their early recognition, the probable modes of transmission, and all means for their prevention that are applicable under the circumstances. That the object of the work be fully met and that physically and mentally defective children be brought to a point of scholastic efficiency, the organization provides not only for the detection of such children, but, where need be, supplies the means for the correction of such defects. Not of least importance in connection with this new duty is the supervision of the buildings occupied by our school population. Such duty demands a knowledge of school-house design, of ventilation, heating, illumination, and approved methods of cleansing.

Excessive infant mortality has been for years conspicuous. The modern health organization assumes it to be an appropriate function to lessen this waste. Believing it due in large part to the ignorance of those directly

in charge of infants, a campaign of education is now conducted as a matter of course. Such education is designed to meet the needs of the most lowly and ignorant. Where the printed or publicly spoken word cannot reach, instruction is supplied in person by trained assistants either officially responsible to the organization or voluntarily co-operating with it.

The fact that disease is often transmitted by insects opens a relatively new field of endeavor for those officially concerned in public preventive medicine. Not only does it demand continued investigation of this important topic, but from such knowledge as is already at hand points directly to the means to be taken for the suppression of those insects known to be dangerous to health. The practical application of this knowledge necessitates the extension of activities of health departments into the field of engineering, and the sanitary engineer is now either officially associated with the best of organizations or co-operates with them when the occasion demands.

The known rôle of animal parasites, protozoa, etc., in the causation of illness opens an almost new field of endeavor for the health officer. One has but to recall the ravages of sleeping sickness, of malarial fever and of the hook-worm to realize not only the increase in health and happiness that would result from their elimination, but, equally as important, the enormous economic advantage of restoring to a condition of physical efficiency the many human beings who are serving as hosts for the causative parasites.

The campaigns against tuberculosis, venereal diseases, and the procreation of mental defectives—in large part campaigns of education—are part and parcel of public preventive medicine and should have their inception with the bodies officially responsible for it.

The foregoing random citation of some of the activities of modern health organizations is made for three reasons: to contrast the manifold official obligations that the newer conditions of life have developed with those of but a short time ago; to indicate how deeply the duties of those responsible for the conservation of the public health have penetrated into and become a part of the life of the people; and finally, to bring out the real reason for the writing of this communication—namely, to insist that the problem of public preventive medicine has grown to such a degree of complexity as to demand a special education for those proposing to enlist their services in its solution.

Unless all signs fail, the activities of the physician of the future are to be more in the field of preventive medicine than hitherto. This means that his interest in the manifold conditions that affect the public health must be stimulated by acquainting him with the ramifications of this many-sided problem. Instruction in public preventive medicine in its broad, comprehensive aspects should, therefore, be taught by all institutions conferring the medical degree, regardless of whether the candidate is to make his life career as a professional sanitarian.

As the problem is as much social as medical, such instruction need not be restricted to the student of medicine, but should be thrown open to those of other departments as well, such as engineers, architects, social and domestic economists, etc., and it should be so ordered as to be readily comprehensible by a heterogeneous audience composed largely of non-medical individuals. This is in no sense reactionary. It should have been done long ago, and had that been the case the place of those properly equipped to provide such instruction and to lead in this field would not have been usurped by the layman and the lay press, as is the case to-day. Scarcely a week or a month goes by that we do not find in our newspapers and magazines articles upon various phases of preventive medicine, and it is interesting to note the avidity with which such articles are read—and understood because of the simple, direct manner in which the matter is presented—by all classes of the community. This widespread education of the people in a subject so closely interwoven with their interests opens the way for vast improvement in the personnel of the organizations responsible for the administration of public health affairs. The community is no longer satisfied that their health officials shall possess political influence, amateurish interest, or desire for prominence as their only claims to the positions. They demand, or soon will, that these officials, one and all, shall have been regularly trained for the important work for which they are employed. As things once were it is perfectly natural for the physician to have been regarded as the one best qualified to direct the activities of public health organizations—and in a way this is still true; but modern developments demand that if the physician aspire to such responsibilities he shall, through special education, have equipped himself for the particular field of endeavor. The competent practitioner in other special fields of medicine acquires his competency, not through a course of study in medicine as ordinarily given, but only after long-continued special study and research in the particular field in which he proposes to expend his energies; and what is demanded in these respects may, with equal or greater force, be demanded of the man to whom is given the graver responsibility of conserving the health of a whole community.

But there arises here another question to be considered: Do the necessities demand that those in charge of public health matters, or those directing special work in one or another of its component fields, shall be medical men who, in addition to medical training, have had the special training which we believe to be necessary to a correct comprehension of the problems involved? As put, we think this question must be answered in the negative; nevertheless, we are of the opinion that in the long run the results of his administration will be more satisfactory if the officer be a specially trained medical man than if he be a specially trained layman devoid of medical knowledge, interests and sympathies. A most important adjunct to the successful Health Board is the medical profession of the

community over which it presides. Between a medical health officer and the local medical profession there will be, as a rule, a better understanding, less antagonism, and more hearty co-operation than between the profession and a lay health officer whom the physicians would regard as ignorant of medicine and out of touch with their interests, no matter what his other qualifications may be. Again, in the course of the day's work the question of acute contagious diseases is always to the fore. In its most important aspects this problem may be and usually is met by specific laws, but there arise almost daily special conditions, not contemplated by laws, which can only be equitably met through the judicial action of the official head of the organization. For these reasons we think the weight of argument is in favor of the specially trained physician. But we are at the same time equally impressed with the belief that such physician should be unhampered in his judicial position by interests in private practice. It is obvious, if this opinion be correct, that the desirable end can be met only through a somewhat different attitude than that generally assumed at present. If trained men, be they physicians or laymen, are to be provided, it must not be forgotten that time, energy and money have been spent in securing training; and that, therefore, the services of such men are worth much more than the compensation ordinarily given. The positions should be such as to attract the best type of trained sanitarian, and the compensation should be sufficient to justify the demand that his entire time and energy be devoted to the duties for which he is employed. His tenure of office should be dependent upon the excellence of services rendered.

There is another important requirement of the work that can scarcely be considered a matter of scientific training. So important to successful administration are tact, knowledge of men and ability to handle them that, be the scientific training never so satisfactory, a deficiency in this respect may render the official an utter failure; while the possession of these qualities may, on the other hand, make of an indifferently trained man a most valuable officer. The quality is individual, it comes to some as an idioplasmic endowment; by others it is in part acquired during more or less prolonged apprenticeship under favorable environment—while by others, the failures, it may never be acquired.

This is scarcely the place to discuss in detail the scientific course of training best adapted to the needs of the health official. Obviously it should be sufficiently comprehensive to give him a clear idea of the important ramifications of the problem and to place in his possession such existing knowledge of the art of sanitation as will enable him to take an effective part in the solution of the problem. To Great Britain and Germany we may properly look for suggestions, since the systematic education of health officials was there begun. We find that a medical training is a prerequisite. This is followed by special training in contagious disease hospitals, or institutes for the study of infective processes; by service in approved public health laboratories, and by specific study in

the several sciences that underlie the successful pursuit of the work—such for instance as chemistry, as applied to questions of water and sewage; entomology and zoölogy in their medical bearings, statistics, sanitary laws; the diseases of animals that are transmissible to man; geology in so far as it relates to soil moisture, drainage, etc.; the sanitary construction of dwellings and schools, and in part sanitary engineering. Such systematic courses of instruction as have been offered in this country have, to some extent, been modeled after those of England and Germany.

At first glance the organization of a suitable course seems a formidable undertaking, but if we realize that many of our universities, especially those supported by the several states in which they are located, are already teaching most of the separate subjects that could properly be incorporated in a course leading to a degree or a diploma in public hygiene, it becomes plain that the difficulties are not so great. It is merely a matter of assembling these separate departments or units into a co-ordinate whole. This is what was done at the University of Pennsylvania, and it was accomplished without any additional cost to the institution. At Pennsylvania, it is deemed wise to demand a medical degree as a prerequisite, and to require of all candidates for the Dr. P. H. degree specified work in sanitary engineering in so far as it concerns the purification of water and the disposal of sewage and other municipal waste; in sanitary architecture in so far as it concerns ventilation, heating, plumbing and the selection of cities; in meat and milk hygiene; in protozoölogy and entomology in so far as protozoa and arthropods are of medical interest; in the inspection of school buildings and school pupils; in physical education and personal hygiene; in bacteriological, chemical and physical methods employed in sanitary investigations; and in general public preventive medicine. Through the courtesy of the municipality opportunity is given to witness and take actual part in the work of large, well-equipped and well-conducted health and water bureaus, the daily routine of which comprehends general preventive medicine and school inspection; the conduct of a hospital for contagious diseases; the methods of record-keeping and completion of vital statistics; house disinfection, meat, milk, and nuisance inspection; tenement house control; child hygiene; and the scientific control of sewage and water purification works. That which is possible at Pennsylvania is probably equally possible in a number of other educational centres.

Since the announcement of the course at Pennsylvania in 1906, eight men have been graduated, and in the present session there are seven candidates for the degree. Between 1906 and 1909 not a candidate presented for the course. This seems slow progress. It is slow, relatively speaking, because the work is an innovation and there has been but little co-operation on the part of other institutions of learning to join with us. We believe the work to be worth while and we believe that in time it will be demanded. We further believe that the postponement of this demand may be to some extent controlled. The larger the number of reputable institutions that join in the movement, the sooner will the popular demand for trained men materialize.

MEDICAL INSPECTION AND THE NUTRITION OF SCHOOL-CHILDREN.

By IRA S. WILE, M. S., M. D., of New York.

If we approach the problem of school lunches and medical inspection with a consciousness that they are interdependent and co-operating to secure the same end, we shall better appreciate their educational importance. The purposes of school lunches and medical inspection are largely identical. Both are designed to act in a preventive and curative way in all phases of physical and mental health. Medical inspection seeks in part to eliminate contagious diseases from the public schools, while school lunches aim to increase the resistance of children to contagious diseases. Medical inspection seeks out physical and mental defects; school lunches aim to prevent or relieve physical or mental defects. The common ground of school lunches and medical inspection might well be said to be the prevention, determination, and relief of malnutrition.

Harrington has well stated that education must consider the student as the subject of its teaching. Skill and judgment are required to maintain or improve the physique and the mentality of children so that they may reap the educational harvest without accident or interruption. Intellectual development and physical improvement are complexly interwoven. The basis of an impaired mentality is the educator's problem. Possibly malnutrition is a causative factor; if so the cure might be in the school lunch.

Medical inspection as related to the public school system makes note of many symptoms which are apparent among the children, but all too frequently fails to get down to the factors responsible for them. Preventive medicine demands a knowledge of causes in order to assure efficient prophylaxis. The personal equations of the medical examiners and their lack of judgment in differentiating the significant defects render most of the available statistics of little analytical value.

There is a noteworthy ratio between physical defects and school progress; in brief, the more defects, the slower the advance in school. The relation between physical defects and malnutrition has not been fully established, nor indeed has adequate study been given to the question of school progress and nutrition. Some educators are beginning to appreciate the importance of good nutrition among school children as a prerequisite to securing attendance, attention and apperception. As Bacon states, "the brain is in some sort in the custody of the stomach."

During the early years of school life nutrition may suffer owing to

incorrect adjustments to school life. A late and hurried breakfast, or, after oversleeping, a rush to school without any food, followed later by a bolted lunch may be manifest in loss of weight and supervening pallor.

It must be recalled that during the years of eight to ten metabolic activity is decreased. This resting period requires special care, as physical resistance may decline while susceptibility to infectious diseases increases.

The metamorphosing years before puberty tax nutrition, and the underfed or malnourished child requires a longer period of time for this most important development. Consequently there may be actual evidence of asthenia and enfeeblement to the watchful medical inspector. To safeguard physical welfare one must recognize the fact, admitted by the Royal Commission on Physical Training in 1903, that malnutrition is a marked cause of low physical standards.

Physical training at the present time takes cognizance of the general development of children, and even goes so far as to give marks for posture, chinning, and exercises of various kinds. Motor training, however, is not merely muscular, but has nerve stimuli for whose prompt action good nutrition is essential. It is well known that in the course of the training of athletes neuromuscular planes are developed through superalimentation. Endurance is not independent of food, and the physical training of children of the elementary schools requires for the successful development of the children an abundant, varied, and sufficient food-supply. The medical inspectors who examine school athletes should give each child the benefit of every doubt when the question of fitness arises—the child is of more importance than the sport, or the coveted medal.

It is most striking that lunches are now being supplied to crippled, anemic, tuberculous, and subnormal children of various types for curative purposes after the medical inspector has called attention to the physical deterioration of the children. These efforts to better nutrition have been successful and accompanied by a marked reduction in physical and mental defects, together with a marked advancement in mental and moral progress. It is all well and good to provide adequate attention for abnormal children and to supply them with food and fresh air, as well as the mental pabulum, but it seems a much more rational procedure to give the same opportunity for the preservation of health to the normal school-children instead of placing a premium upon ill health.

In every community there are many poorly fed children, the inadequacy of whose diet is shown in part as anemia, underweight, enlarged glands, and similar symptoms. Malnutrition is a factor, though to be sure not the only one, in the etiology of tuberculosis, adenitis (enlarged glands), anemia, defects in vision, mental defects, chorea (St. Vitus's dance), protracted convalescence from diseases, and impaired resistance to infections.

The immense proportion of dental defects has been given undue atten-

tion without appreciating the fact that the permanent teeth develop during the school period. The importance of the proper food calling for mastication for the development of dental structure has been lost sight of in contemplating the enormous number of cavities. Poor food, deficient in lime and other salts, means poor teeth and consequent decay. As the result of decay, infection, and toothache, proper mastication becomes impossible, appetite decreases, malnutrition supervenes. There then results a lessened supply of food for dental growth and more decay ensues and a vicious circle is formed. General nutrition depends in part upon a good set of teeth—proper teeth demand proper food.

A second factor in malnutrition to which insufficient attention has been given, is the effect of the under-nourishment of the years previous to a child's entrance into school. The relative starvation in proteids, lime, iron, calcium and magnesium during the first five years of life helps to produce the child suffering from malnutrition upon entrance into the public school. The report of the medical inspector, however, will probably class such a child as belonging to the group with such physical defects as enlarged tonsils, anemia, or enlarged glands. The diagnosis of malnutrition is not made if any other defect is present. The dependence of such defects upon malnutrition or their interdependence or their coincidence is not entered into the record, and so the statistics of medical inspection, as related to malnutrition, are decidedly false and misleading.

Chronic underfed children are far more vulnerable to contagious disease and more susceptible to protracted colds and bronchitis. Their poor musculature and sluggish circulation make them more likely to fall victims to the various diseases to which they are exposed through the intimacy of school life, and as a result their absences are more numerous. For the same reason their convalescence is retarded, their complications are more numerous, and their loss of education and training through absence is far greater than that of other children of the same age in a better state of nutrition. One of the underlying factors in chorea is a disturbance of nutrition. The New York Committee on the Physical Welfare of School-Children found 26.2 per cent. of chorea among children suffering from malnutrition as opposed to only 3.6 per cent. for 1,400 children examined by them. This same committee found that malnutrition occurred to the extent of 10.4 per cent. among 1,400 children in October, and 12 per cent. in April among 900 children re-examined. This shows the deterioration of children during the course of a school year due to inadequate home feeding.

The purpose of school lunches is not to relieve acute hunger, but to relieve chronic underfeeding. Hogarth has defined malnutrition as "an abnormal or disordered growth in the development of the tissues and organisms of a child's body not necessarily synonymous with underfeeding," and he wisely states: "Malnutrition is at once the most common, and until recently, the least observed of all the unrecognized diseases and

affections among children attending elementary schools." The problem of malnutrition is not concerned merely with the breakfastless children or those without any particular single meal, but with all the children who for long periods of time are receiving at home a dietary that is not adapted to their needs, and in consequence of which there is marked physical deterioration.

McMillan, of Chicago, found 15.9 per cent. of kindergarten children physically below par, and estimated that underfeeding was the cause in 11 per cent. in kindergartens and 7.8 per cent. in other grades. MacKenzie regards one-third of all the school-children in Edinburgh as poorly nourished. Maxwell is reported as saying to the National Educational Association in 1904, that there are hundreds of thousands of children unable to learn because of hunger. Warner and Tuke found 28.5 per cent. of London school-children suffering from deficient feeding. The New York Committee on the Physical Welfare of School-Children in 1907 declared 13 per cent. of 990 children examined to be suffering from malnutrition, and Sill in 1909 estimated that 40 per cent. of the children in the elementary schools of New York City were poorly nourished. The New York School Lunch Committee in 1910, in an examination of 2,150 children, adjudged 13 per cent. to be marked cases of malnutrition. In Chicago in 1908, of over 10,000 children examined, 12 per cent. were reported as suffering from malnutrition. In Boston in 1909 underfeeding was found in 16 per cent. of over 5,000 children. In Philadelphia in 1910, 24 per cent. of 500 children examined were found to be suffering from underfeeding. In St. Paul in 1910, 20 per cent. of 3,200 children in schools in the poorer districts were reported as manifesting the evidences of marked underfeeding. In Rochester malnutrition was noted in 5 per cent. of the children examined.

What does all this underfeeding mean? It means that the problem of nutrition has been neglected. The writer admits that the causes of under-nourishment are numerous and closely connected with faulty housing, overcrowding, low wages, under-employment, alcoholism, poor hygiene, and ignorance of food values. The first step in the problem is the determination of malnutrition. The potential ties of educational measures may be regarded as dependent upon the state of nutrition. Lord Dufferin has remarked that "our mental functions, our memories, our attention, our power of continuous application are even more dependent for vigor and vitality on the general condition of our health than is the play of our muscles."

In a memorandum of the British Board of Education we find noted: "Medical inspection seeks to secure ultimately for every child, normal or defective, conditions of life compatible with the true education, which is that free and effective development of its organic functions, special senses, and its mental powers." This places inferentially the burden upon medical inspectors to appreciate all obstacles to the effective development

of the organic functions. Low nutrition or malnutrition should come properly within the scope of their studies.

The symptoms of malnutrition which have been overlooked are noted as anemia, pallor, muscular weakness, squints, diseases of the external eye, lassitude, inattention, backwardness, and mental dullness. Among the results are stunted growth, delayed physical and mental development, weaknesses of the spine, increased susceptibility to infectious diseases, and marked liability to tuberculosis. Twenty-five per cent. of our public school-children fail to attend school 75 per cent. of the time. Preventable disease is a large factor in this unfortunate number of absences, and malnutrition plays no small part in preparing the soil for such preventable diseases.

Medical inspection of children under twelve years is of the utmost importance in order to safeguard physical development at puberty. To neglect the state of nutrition during the early years of school life is to cast aside an opportunity of protecting the growing child from the strains and stresses of puberty against which the nervous system should be well fortified.

Puberty is a period of general acceleration of growth. There is an increase of height, of weight, of strength; there is a modification of the nervous system with the development of the emotional side of the child's nature, and a susceptibility to impressions such as occurs at no other period of life. In addition to this, puberty forms the period of the development of the sexual characteristics which bring to bear upon educational problems all the variations that may come from the dominance of sexual emotions and the manifestations of sexual development. Physical education must embrace more than a question of muscles; it involves brains, sex life, and general stability. It is not a question as to whether a muscle is hard or soft, short or long, or thin or broad, but it is a question as to the general physical efficiency of the child, and this involves its mental as well as the ordinarily termed physical attributes. The opportunity to affect the pubertal development of the children is given only during the prepubertal period, and this represents the period of greatest activity of the schools.

The part that medical inspection may play in determining the state of nutrition is of immense hygienic value. The prompt detection of downward tendencies in nutrition and vitality would enable the child's parents to know the necessity of encouraging heartier eating or of affording a more concentrated dietary.

Gershel has demonstrated that dependent Jewish boys grow 14.86 in. from their fifth to their fifteenth year, while Bowditch shows that the Boston boys grow during the same period 20.8 in.; according to Porter, St. Louis boys grow 18.1 in., and the English Anthropological Committee find 21 in. to represent the boy's growth during this period of life. At five years of age the average Jewish dependent boy is 1.6 in. shorter

than Boas' average; at ten and a half years he is 1.68 in. behind; at eleven and a half years 3.40 in.; at fourteen and a half years 5.58 in.; and at fifteen and a half, 7.9 in. behind the average for boys of the same age, according to Boas. Gershel accounts for this by stating that during "the important age of puberty he had undergone many sufferings and privations at an age when freedom and proper nourishment are absolute essentials." If the home is unable to supply adequate nourishment it is wise to extend the institution of making a food-supply available in the elementary schools for the purpose of preventing the physical, mental, and often moral breakdown of the children during the period of elementary school life.

In Berlin in 1906 and 1907, 8.7 per cent. of the children entering school for the first time were barred because of ill health, and 25.8 per cent. of the children were placed under observation because of defects.

The paramount activity of the medical inspectors should be among the children entering schools for the first time. To be of maximum value medical inspection must virtually become medical supervision. The medical inspector has the marvelous opportunity of becoming an established prophylactic advisor for six, seven, or eight years to the most important part of the community—the race determiners of the next generation.

Frequent inspection is indicated because the new school environment with poor air, overstrain, excitement and worry may spend itself upon the appetite and digestion with a resultant deterioration in nutrition. The early recognition of lassitude, anemia, and irritability may be the means of preventing a marked decline in nutrition and vitality. To quote from the Report of the Poor Law Commission in 1909: "I am satisfied," writes Newman, "that much illness is prolonged quite unnecessarily, and that there is a lamentable and disastrous amount of failure to deal with the beginnings of disease. Neglect of such things leads to mortality more than any other factors."

Gastpar, of Stuttgart, has demonstrated that the proportion of defects varies with the state of nutrition of the school-children, and the better the state of the nutrition the fewer the number of defects.

The reports of medical inspections are not uniform, as may be judged by the single fact that in 1906 malnutrition was reported in New York City as 6.3 per cent., while Minneapolis in 1908 reported 23.3 per cent. It is obvious that such disproportion does not exist. This fact is accentuated by a comparison, in the two cities, of the diseases and defects that are closely related to the problems of malnutrition. For example:—

RELATIVE PREVALENCE OF DISEASES IN SCHOOL-CHILDREN.

Kind of Disease	New York, 1906	Minneapolis, 1908
	Per cent.	Per cent.
Anterior cervical glands enlarged.....	37.3	53.0
Posterior cervical glands enlarged.....	11.0
Chorea.....	1.7	0.2
Defective vision.....	22.8	23.9
Defective teeth.....	55.0	43.5
Hypertrophied tonsils.....	23.3	31.1
Adenoids.....	12.0	12.8

Obviously these figures relating to the symptoms of malnutrition show that the New York figures of 1906 are too low.

The relation between defects of vision and malnutrition is suggested by the examinations in Cleveland in 1907 when the defects of eyesight in well-to-do districts were stated to be 32.4 per cent., while among the children in congested districts they were 71.7 per cent. Appreciating the importance of a correlation between malnutrition and defects of vision, which are not all essentially optical in character, it is well to consider the extent of defective vision in some of our cities and states.

OBSERVATIONS ON DEFECTIVE VISION IN CHILDREN.

Locality	Number Examined	Defective Vision
		Per cent.
Bayonne.....	4,610	7.7
Camden.....	10,028	27.7
State of Massachusetts.....	402,937	22.3
Milwaukee.....	1,960	14.9
New York City.....	79,065	31.3
Pawtucket.....	4,663	11.1
Worcester.....	11,953	19.1

The nature of the defects of vision is not stated in definite terms.

Among the 20,000,000 school-children of this country, Wood has estimated that 5 per cent. have spinal curvature, flat-foot, or some other moderate deformity. Even the question of flat-foot or scoliosis is not always a question of muscle as much as it is a question of relaxation from under-nourishment. It has been estimated that 40 per cent. of our children in high schools suffer from flat-foot, and it is fair to assume that a still larger proportion of this difficulty is to be found among the children of the elementary schools who are twelve times as numerous. 5 per cent. are said to suffer from defects of hearing, 25 per cent. from defects in vision, 30 per cent. from enlarged tonsils, adenoids or enlarged cervical glands, 50 per cent. from defective teeth; and 25 per cent. are regarded by him as suffering from malnutrition, in many cases due in part at least to one or more of the defects noted.

The relation between cause and effect may not be clear where so many varying factors are concerned. It is evident, however, that malnutrition is not regularly considered in its causative relation. Whenever another defect is noted, malnutrition is not regarded as worthy of notation unless

starvation be apparent. Regardless of the primary factor in malnutrition, whether it be due to a deteriorative reaction against an oppressive physical environment, or to unhygienic home conditions, or to lack of adequate or sufficient food, no inspection card should be regarded as complete without some notation regarding the state of nutrition. This position is strengthened by the comment of the Chief Medical Officer of London (1910): "It is certain, that malnutrition and physical defects are closely associated and react upon each other, but it is difficult to determine their exact relation to each child or to say in what degree malnutrition causes the other physical evils. Merely to increase the supply of food would in many cases not solve the complex problem of the individual child, although in many cases lack of food lies at the root of the mischief."

The statistics of medical inspection make another error that is extremely misleading, inasmuch as they are calculated all too frequently in terms of the number of examinations made instead of the number of children examined. It is, therefore, impossible to come to a correct understanding as to the exact number of defects in any one child, or to an appreciation of the relative number of children in the school population suffering from any single pathological condition. The total absence of the term 'malnutrition' in many statistical tables shows that this phase of the problem is entirely omitted in a consideration of medical inspection. For example, the state of Massachusetts in 1906 and 1907 reported the examination of 343,000 children having 27,342 defects, but malnutrition is not numbered among the conditions reported.

The relation between nutrition and medical inspection is patent. Medical inspection should be so thorough as to indicate not merely the names of various symptoms and conditions, but should suggest whether or not malnutrition could possibly be an underlying factor. Under such conditions school lunches could serve in a remedial way by raising the standard of nutrition. Frequently medical inspections reveal some children not possessing marked defects, but who are very close to the health poverty line, and for them school lunches could be instituted for prophylactic purposes. Most civilized countries have already installed school lunches as a natural and normal part of an educational movement without laying unnecessary stress upon its value as a health measure. As medical inspections are regarded as advantageous to the school system through the lessening of disease and the improvement of the mental calibre of the children, careful attention to nutrition may supply a valuable means of increasing mental activity and building up the physical health of our school-children.

THE HISTORY OF PREVENTIVE MEDICINE IN THE SOUTH.

By JOSEPH HOLT, M. D., of New Orleans,

Ex-President of the Louisiana State Board of Health; and Author of "The System of Modern Maritime Sanitation."

To compress within a limited space a review of the health history of a great metropolis or of fourteen states, with varying experiences and millions of inhabitants, would hopelessly exceed the possibilities of ingenuity but for the saving ability to generalize under the natural law the facts of causality. To apply any standard of measurement to the South, we must justly bear in mind that, within the memory of persons now living, many of these states were largely in primeval forest and unbroken prairie—the home and hunting-ground of Indians. We must also bear in mind that a knowledge of hygiene, as an established science, is a product of the latest enlightenment through clinical experience and biological research. So recent, indeed, that the ninth edition of the *Encyclopaedia Britannica* of 1878 makes brief mention, severely technical, of the subject, treated under four or five headings; while the eleventh edition, in thirty-four divisions and references, devotes thousands of words to popular instruction in hygienic knowledge and the art of sanitary defence.

Hardly out of the cradle of experimental infancy, its robust development is a modern wonder, even in these times when nothing can amaze. Its revelations, already trite in the public mouth, were hardly dreamed of as speculative possibilities twenty years ago. We must remember that from their earliest settlement, the seaboard states of the South, in addition to the ordinary exanthemata and other infections common to the temperate zone, were compelled to bear the brunt of pestilential foreign invasion along several thousand miles of Atlantic and Gulf littoral: from Baltimore to Key West, thence to the Rio Grande and nearly the length of that river as the Mexican boundary, wide open to commerce and the concomitant entry of the morbidiferous fauna and flora of the tropics, particularly the hypothetical protozoön of yellow fever, the *S. cholerae asiatica* and the *B. pestis*.

Through all the years of its medical history, the health officers and medical practitioners of the South, under the spur of necessity, have kept in close touch with the world's best thought and experience in clinical recognition and treatment, but especially in proposed methods of defence against introduction; the states themselves and communities, backing these efforts with ample authority and appropriations.

As long ago as June, 1884, the state of Louisiana, desperately wearied

of the perpetually recurring outbreaks of imported pestilence, fatal alike to her people and to the public livelihood, appropriated \$30,000 as an experimental venture, based upon faith in the logical validity of the writer's argument before the Legislature, urging the substitution of Maritime Sanitation, of brief duration and moderate charges, for Quarantine of long delay, as its name implies, and of ruinous cost: a flimsy veil to infections but an effectual bar to commerce.

These remarks were reiterated, a few months later, before the American Public Health Association in Washington. To quote briefly: "The term maritime sanitation, is in itself a complete acknowledgment of allegiance to the germ theory of infections, just as the word quarantine carries within itself the idea of prolonged detention; an acknowledgment of utter ignorance of all the conclusions established by modern observation of the phenomena of these diseases, confirmed by microscopic research and experimental tests.

"We no longer fight the machinations of the devil as the devil himself, but a microscopic or ultramicroscopic germ—a living ferment—which, if not speedily destroyed, soon leaveneth the whole lump.

"If the essential element or originating principle of smallpox, yellow fever or cholera can be demonstrated to exist within a definite and circumscribed limit, as in the field of a microscope, on the point of a scalpel, within the compass of a hypodermic syringe or the hull of a ship, and is capable of indefinite extension beyond that limit, it is conclusive that the essential cause or virus, having power of extension, can only do so by reproduction. It is, therefore, a living entity, and being definable *in loco* can be destroyed *in loco*.

"Seeing the germ satisfies the intelligence and confirms belief, but is not essential to the validity of disinfection.

"This is the sum of all the law governing maritime sanitation. When the entire atmosphere within a ship has been displaced with concentrated sulphurous acid gas, we have availed ourselves of the highest assurance offered in practicable and speedy disinfection. There is but one guarantee of a more positive kind—total destruction by fire."

Having invented and applied the apparatus competent to complete the work speedily, and to wet all surfaces with a solution of mercuric bichloride—1:1,000—but not aware of the mosquito and of the rat-flea, as intermediate hosts, from kelson to cross-trees, every mosquito, rat, roach and other biological form were destroyed; anticipating in successful results, through irrefutable logic of induction, the later findings of the mosquito theory of transmission in the report published October, 1900.

Even to this day, the essential virus of yellow fever is ultramicroscopic, not seen in mosquito or ship, but logically inferred, as it was by New Orleans, sixteen years earlier, when, through inference, she demonstrated her protection against this foreign infection and had already taught the world.

A control test in final proof was furnished when, on occasion of unfaithfulness and utter neglect of scientific management, yellow fever entered at once and repeatedly with widespread disaster. The Federal Government finally took charge with a master hand, and then a complete cessation.

From 1869 to 1879, eleven years inclusive, yellow fever occurred here every year, with a total mortality of 5,096. During the seventeen years following, there were ten deaths and yellow fever ships in brief detention of sanitation every year, while people ceased to be afraid. Introduced six times, not in shipping, prompt recognition, no concealment, a total reliance in the sufficiency of applied science, no spread.

SCHOOL OF TROPICAL MEDICINE.

As an imperative necessity of health protection, in the conservation of the productive industries and commerce, the construction of the Panama Canal and the powerful interests developed under the management of the Tropical Fruit Trade have compelled the enlistment of exact knowledge imparted through technical training of medical men, in order to safeguard these vast interests in the territories of demand and supply against the transmission of infections, and to protect the territories, within themselves, from the insidious ravages of the diseases of tropical and semi-tropical regions.

These enormous industrial enterprises, by common consent and the strongest material encouragement, have founded the Department of Tropical Medicine, Hygiene and Preventive Medicine, in Tulane University, as already the logical centre for a School of Tropical Medicine in the Western Hemisphere.

SANITARY HISTORY REGISTERED IN MORTALITY CHART.

Hygiene and preventive medicine are correlative, as inseparably as cause and effect.

It has taken nearly two centuries for the American people to evolve, through education and the spread of ideas, into a full knowledge and working acceptance of this fact: that Nature exacts her penalties to the uttermost farthing, unmoved by bonfires of tar-barrels, religious processions and long-drawn prayers, desperately urged by ignorance, superstition and terror.

Invariably swamped by these methods, their failure has compelled us to rely upon the intellectual spirit within to tell why fire will burn, water drown, putridity poison, uncleanness devitalize and degrade, how pestilence will appear and spread, and all under natural law—as coercive of evil consequences as of good, with equal indifference.

For convenience and to illustrate universal principles that may be reflected in diagram upon the health-chart of any community or state, we

present the wonderful mortality chart, worked out by the late Dr. Sidney L. Th  ard, of the City Board of Health of New Orleans. These zigzag markings, mostly hieroglyphs of our early civilization, exhibit an epitome of all the histories and medical writings on the health of New Orleans. It merely requires competent interpretation. Every movement in the rise and fall of these multicolored lines registers a sanitary violation or a conformity. These mighty leaps upward in the scale chronicle the epidemic advent of imported pestilence. The chart is based upon the death-rate per 1,000, as a sure index of the general health. It begins with the year 1808, showing the mortality of a people desperately struggling against incredible hardships and adversity, in a vast and savage wilderness far from home, down in the flat of a scarcely redeemed swamp, hedged about by cypress and palmetto jungle, exposed to vicissitudes of wind and weather, poorly housed and scantily clothed, few comforts, no sewerage, and drainage little better, a vitiated, stagnant water supply in huge wooden mosquito hatcheries, called cisterns, and the port wide open to filthy, overcrowded ships from Mexico, Havana and San Domingo. Deaths per thousand, 54; the next year, 68; then a decline to 33; then up to 46, 58, 40, 73, 81, 86, and so on until 1832, when it vaulted to the prodigious mortality of 147 per thousand: one in every six and three-fifths of population—cholera and yellow fever. After that it rarely descended to less than 36, and a leap to 125 in 1853—yellow fever; then up and down between 80 and 32, until 1863, when the city, under the guidance of Dr. C. B. White, President of State and City Boards of Health, inaugurated a well-planned, vigorous campaign of general cleaning. The death-rate rapidly declined and oscillated between 38 and 26 per thousand.

The epidemic of 1878 reached a mortality of 53; the last of those dreadful figures of the days of *laissez-faire*, so fraudulently imposed upon our credulity by tradition as the good old times—amid the festering accumulation of a city's excreta.

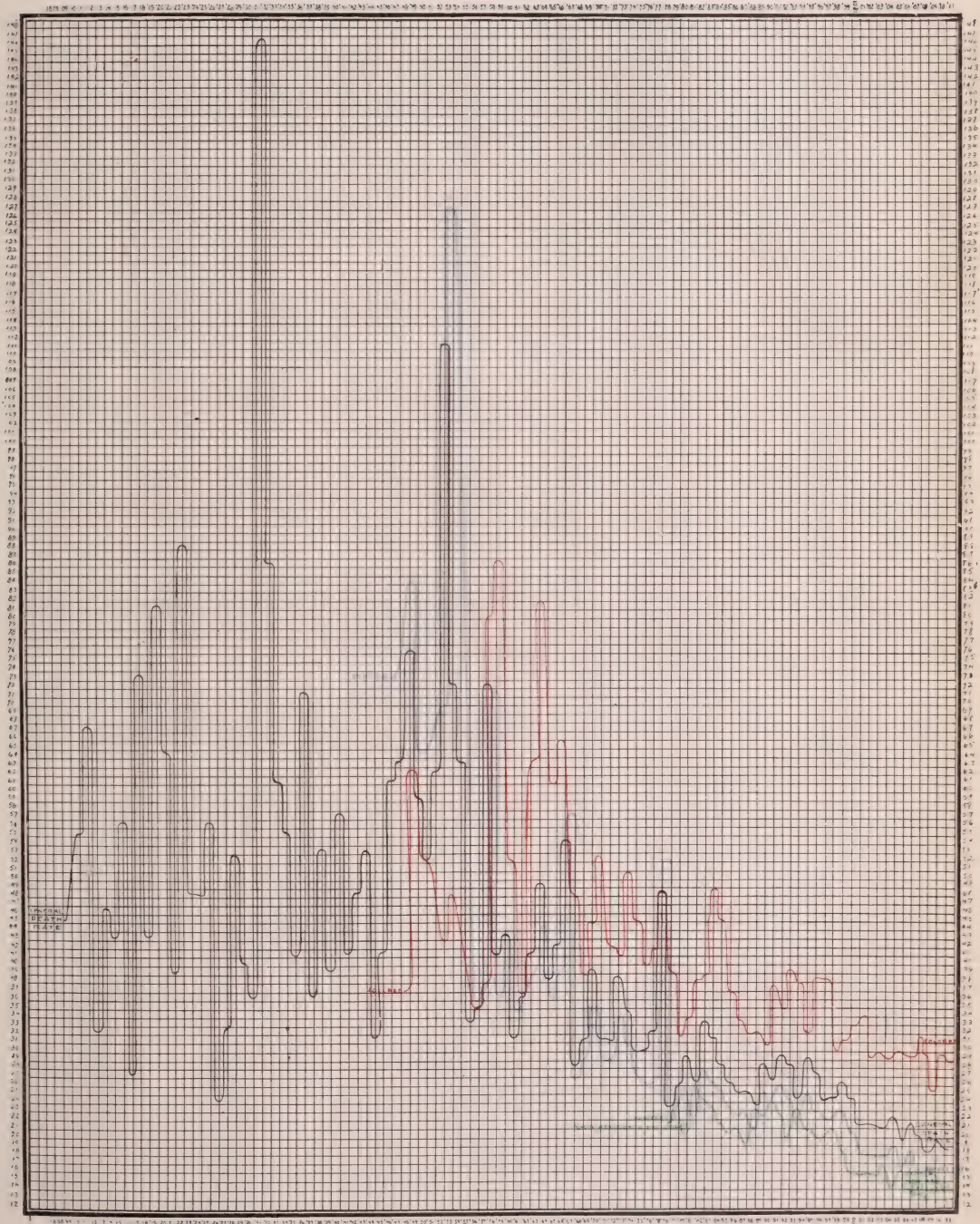
The consternation was sufficient to arouse the whole people to an intense interest in the public health protection, including the invention and installation of a modernized system of maritime sanitation as the only salvation of the seaboard and the highest possible guarantee of safety for the interior.

Under compulsion of necessity and by main strength of moral determination and prodigious activity, New Orleans was pulled over the great divide—as registered in the chart—between the anarchy of corruptible matter in horrible domination and the present reign of enlightenment under hygienic law.

Pari passu with the extension of paving and of the sewerage and drainage systems, there has been an amazing betterment. For 1908, closing a century of this chart, the death-rate had fallen to 17, and in 1912, whites 13.88, colored 16.78 per thousand; thus putting New Orleans, with

Rate
per
1000.

Rate
per
1000.



Mortality Chart, New Orleans, showing the general death-rate from 1808 to 1911, the death-rate by color since 1847, and the white death-rate, exclusive of non-residents, since 1880.

a large and mixed population of 370,000, in an assured position among the healthiest of cities.

SUMMARY OF EVIDENCE.

In the foregoing exhibit, through many years of comparison, we observe the health conditions of a people in an environment of absolute sanitary neglect, and, later, of the same people chastened in a school of hard experience, finally emerging through education into willing and obedient subjection to hygienic law, with all of its blessings of decency, health and comfort.

Omitting a weary recital of health incidence in each of the many states, we have endeavored to illustrate, through local example, a generalized statement of the laws of causality, of development and progress, with special schemes of permanent control, and of management to meet emergencies affecting the public health, presented synthetically as—The Philosophy of the History of Preventive Medicine in the South.

THE EDUCATIONAL FUNCTION OF THE STATE HYGIENIC LABORATORY.

By W. A. SAWYER, M. D., of Berkeley, Cal.,

Director of the Hygienic Laboratory of the California State Board of Health.

Even in the early stages of its development, the hygienic laboratory of a State Board of Health should seek to exert an educational influence. At the beginning, such a laboratory usually devotes itself almost entirely to certain diagnostic tests, and teaches their value in confirming, supplementing, and correcting the results of bedside observation.

During this early stage of undifferentiated function, a hygienic laboratory escapes with difficulty from being regarded as merely a dispenser of free diagnostic examinations for the benefit of many physicians and their individual patients. Constant repetition in courteous letters of explanation and in circulars dealing with the work of the laboratory will in the end firmly establish the understanding that the state hygienic laboratory is maintained for one purpose only—for the improvement of public health. It is only incidentally that the individual physician's work is helped and the patient's recovery hastened. Not even to answer the appeal for charity to unfortunate individuals or struggling institutions, should the resources of the laboratory be deflected away from the field of public health and toward individual medicine.

An understanding of the purpose of the laboratory explains why examinations for tuberculosis, typhoid fever, diphtheria, malaria, gonorrhea, plague, and rabies are considered as proper functions, while examinations of new growths for malignancy, or of urine for evidences of nephritis, are looked upon as out of place. The chief motive in making diagnostic tests is to keep the health authorities informed regarding the prevalence and movements of outbreaks of preventable disease, and to furnish scientific evidence which can be used in teaching society where it needs to make its strongest efforts toward disease prevention.

As the laboratory develops, it finds itself called upon more and more to settle the practical public health problems of the day, and to furnish the local and state health officials with a scientific basis for executive action. The carrying on of investigations at the point of special need is a function which affords greater opportunities for assisting in the solution of our health problems than the making of routine diagnostic tests. It should be the ambition of a state hygienic laboratory to maintain such high standards and to work so vigorously and effectively that the public will regard it as the final court of appeal in its own field. When the

people of the state will commonly say, "The State Board of Health has referred this problem to the hygienic laboratory and the facts will soon be known," the laboratory will be exerting an educational function of the highest order, and will be making impossible the distrust which has frequently arisen from the feeling that health officials act arbitrarily and without sufficient scientific grounds. This ambition cannot be reached in laboratories where, for reasons of economy or from shortness of vision, the work is being done by physicians who are in public health work only for the purpose of financing their early days of medical practice. Public respect and efficiency rise with a bound when the old order of things is banished, and the laboratory calls to its staff, from far or near, experts whose entire services are purchased by the state with the understanding that no outside occupation will be engaged in, be it the practice of medicine, or private laboratory work, or such teaching as does not bear primarily on public health.

To illustrate the educational value of special investigations by the laboratory staff, the writer will draw on experiences here in California. For the past two years, a member of the staff has made a thorough bedside and laboratory investigation of all human cases reported as bubonic plague. The proving or disproving of the cases alone does not justify this work, as it is parallel to careful and authoritative investigation by the United States Public Health Service, in which we have the utmost confidence. As an educational measure, however, the investigation by the state is of great importance, as it shows the people, through the work of their own state experts, what the plague situation is. Much unrest and distrust has been fostered by the writings of persons hostile to the Public Health Service, ever since the violent dispute over diagnosis, which was stimulated by commercial interests on the first appearance of plague.

A few years ago, a disease gained a foothold in California which had, so far as known, never been present before. The physicians of the state and the public had little knowledge of rabies, which depends for its control so largely on the intelligent co-operation of the general public, the legislators, and those skilled in human and veterinary medicine. Soon after the first appearance of rabies, the laboratory began making diagnostic examinations of the brains of animals or persons suspected of having the disease. Six hundred such examinations have already been made. Whenever the specimens gave negative or inconclusive results under the microscope, animals were inoculated as a final test. Health officers were informed of the appearance of rabies in their territory or nearby, and assistance was given to their efforts to initiate measures against the disease. A pin map in the laboratory was used constantly to show the territory involved. A great deal of correspondence and several published articles furnished to physicians and laymen information regarding the disease, and warned them of its steady spread from south to north over our state. When finally the large number of persons needing the Pasteur preventive

treatment made it advisable for the laboratory to manufacture as well as to administer the virus used, we considered it important, not only fully to meet every requirement of the government for laboratories manufacturing virus for interstate commerce, but also to secure a government license, which gives the people additional assurance that every precaution is being taken to make the treatment safe. The information disseminated in connection with rabies has almost ended our experience with the statements of careless physicians who were saying freely that they had never seen cases of rabies in California, and that therefore the disease did not exist, and with the cranks who accused us of claiming the presence of an imaginary disease out of hatred for dogs or love for the manufacturers of antirabic virus.

In many of the special investigations it is necessary for a member of the staff to go out into the field and to make inquiries among the people, to examine patients, to consult with physicians, to make public talks, and to bring specimens back to the laboratory for examination. One of the staff not long ago was sent to investigate a throat affection, which was causing much excitement among the people and physicians of a small town. The county health officer considered the cases to be diphtheria, but the few local physicians and most of the public disagreed with him. The local physicians had not even been taking cultures from the throats of their suspicious cases. One of the doctors was treating his cases by cauterizing the throats with phenol, and he stated that he did not consider the disease to be diphtheria because the cases recovered, and he had read that diphtheria was a fatal disease. This instance is an extreme and unusual example of the need for the education of practitioners of medicine along lines as well understood as the resort to throat cultures, antitoxin, and quarantine in diphtheria. The 'Citizens' Committee' wanted matters explained, and the community was well informed regarding diphtheria before the conferences were over. The educational value of this trip was far above the worth of the knowledge obtained for the State Board of Health that the outbreak was diphtheria, and that the contentions of the health officer were correct.

One of the special investigations in California resulted in the discovery of a typhoid-carrier in the crew of a ship. This man had given typhoid fever to twenty-seven other sailors, four of whom had died. This investigation and subsequent inspections of ships brought the laboratory in contact with ship-owners, and resulted in such changes as an improvement in the method of storing drinking water on several lumber ships, and the establishment of a bacteriological standard of purity for the milk supply of a line of passenger steamers. We found the owners of ships very anxious to receive expert advice regarding the control of disease on their vessels. We consider painstaking compliance to requests for information to be a valuable part of the educational function of the laboratory.

From time to time the laboratory has been called upon by the State Board of Control or health officials to make efficiency tests of disinfectants. Whenever the method was applicable, the Hygienic Laboratory Phenol Coefficient was determined. Our work soon revealed marked discrepancies between the claims on the labels of many of the packages and the properties of the contents. The State Board of Control soon took advantage of tests which enabled them to consider cost per unit of efficiency in awarding contracts for disinfectants for state institutions. The laboratory consistently advised the public to favor the products of manufacturers who would state the bactericidal strength of their product on their labels, preferably in terms of the Hygienic Laboratory Phenol Coefficient. In one instance, an oil was examined for which most miraculous germicidal powers were claimed. We found that it was incapable of killing dried typhoid bacilli when they were soaked in it for sixteen hours. The manufacturer of this substance, when shown the error of his ways, agreed to abandon all claims of germicidal properties for his product. The makers of disinfectants began consulting us regarding the methods of making bacteriological tests and the feasibility of standardizing their products according to bactericidal efficiency.

We realize that the object of educating the public and the manufacturers of disinfectants to value them according to their usefulness rather than their formulæ, their physical properties, and the ingenuity shown in composing their labels, is the prevention of fraud, more than the direct promotion of health. Chemical disinfectants, nevertheless, do play a part in the prevention of disease, and their discussion gives many opportunities for sermons on the relative importance of the human carrier and the infected room, and on the harmlessness of the ordinary bacteria of the air. Public health education should not only teach people what to do to keep well, but it should also instruct them what they do not need to do, so that they can avoid being swindled by those who exploit the sick and the apprehensive.

Perhaps the highest type of education by the hygienic laboratory, and the last to be reached, is the promulgation of discoveries acquired through research along intensely practical lines. In California, research has become a recognized function of the hygienic laboratory. For instance, at present we are carrying on an investigation of the methods of transmission of epidemic poliomyelitis, with the purpose of determining what executive measures are essential to the control of the disease.

The laboratory is frequently called upon to take part in education in the narrower sense of teaching in schools and colleges. Dr. Wm. F. Snow, Secretary of the California State Board of Health, has long been interested in the devising of demonstration material for the use of teachers and lecturers. Those who have seen the Health Exhibition Car of the California State Board of Health will remember the many interesting models which were used for driving home lessons of health conservation.

At Dr. Snow's suggestion, a bacteriological instruction outfit was devised at the laboratory. A considerable number of such outfits have been loaned to teachers and lecturers. The outfit is packed in a pine box with brass hinges and padlock. Inside are nine sealed Petri dishes containing killed cultures showing bacteria from the rim of a public drinking cup; germs growing in the tracks of a fly; germs settling from still air contrasted with the bacteria which fall after sweeping; the killing effect of sunlight on bacteria; the germ content of ordinary store milk compared with that of certified milk; the bacteria growing in a finger-print; and the sterilizing effect of boiling on inoculated threads. A Petri dish containing sterile nutrient agar is enclosed for an experiment by the class. Two test-tubes containing killed cultures of tuberculosis and diphtheria, and a slide-box containing seventeen microscopic preparations showing pathogenic micro-organisms are furnished for use by teachers or physicians who possess the necessary microscopes and technical training. A package of various paper sanitary contrivances, such as cups, handkerchiefs, towels, and sputum receptacles, accompanies the outfit. It is hoped through this assistance to teachers to help in giving pupils a proper notion of the material nature of the causes of preventable disease, and to instil into their minds the idea that the causes of disease are to be studied and overcome rather than to be feared and let alone.

The situation of the State Hygienic Laboratory on the campus of the University of California has made it possible for members of the staff to take part in university instruction along lines of public health. Courses in public health have been given in the regular and summer sessions; graduate students, engaged in research on public health problems, have been directed in their work; and lectures and demonstrations have been furnished in the undergraduate and medical departments. In the more purely technical part of its work, the staff is always ready to give instruction to those engaged in public health work. For example, bacteriologists of several of our larger cities and of one of our neighboring states have spent time in the laboratory perfecting their technique in making diagnostic examinations for rabies.

The talks which members of the staff are called upon to give in connection with trips of investigation help to bring into co-operation city and county officials, women's clubs, school-children, and the general public. One of the most important educational functions of the laboratory is the dissemination of knowledge through a large number of letters, many of which are sent in direct response to questions.

The all-important educational function of a state hygienic laboratory is the transmission of the results of its scientific investigations in such a way that they will be of the greatest possible usefulness to the immediate needs of the public health. Of secondary but real importance is the educating of the people of the state to appreciate and intelligently to criticize measures aimed at the improvement of the public health.

ERADICATION OF MALARIA.

By C. C. BASS, M. D., of New Orleans.

The writer desires to present here certain views which, if correct, indicate that the existence of malaria in this country could be prevented or at least reduced to a minimum. If they are correct, it will be a discredit to the intelligence of any community, or of any people, for malaria to be prevalent after the simple facts are known.

A few months ago there was held in Norfolk, Virginia, a conference of physicians, health officers, sanitarians, governors and others interested in the eradication of malaria. There was a symposium on malaria at the medical society meeting that day and the subject was quite fully discussed. Those who attended the conference afterward were pretty well prepared to think of and to discuss the special phase of the malaria problem under consideration—namely, eradication of malaria.

Eradication of malaria from the United States would not appeal to those of us who have not given the subject special thought as within the bounds of possibility; but the writer is confident that many at the meeting left with the conviction that it was quite possible and actually could be accomplished in a short time. Though such an undertaking would require considerable funds, there is no doubt but that they would be promptly offered by some philanthropist, if the facts or possibilities were known to him or her. It is quite possible that, properly undertaken, a great deal more could be accomplished in the saving of lives and resources of the country that are now wasted by this important disease than in the instance of the less destructive hookworm disease.

One of the speakers at the conference was Capt. Chas. F. Craig of the United States Army and chairman of the Commission for the Study and Prevention of Malaria, recently appointed by the Southern Medical Association. He directed attention to statistics which he had gathered showing the wide distribution of the disease in the South. The annual toll of thousands of lives and the very much greater number incapacitated for days and weeks emphasize the fact that this is a national problem of great importance.

It will perhaps be interesting to recount some of the suggestions made by those who addressed the conference. It will be necessary, however, to state some of the fundamental principles and facts relating to the transmission and treatment of malaria. These are well known to those familiar with the subject, but, though simple and vastly important, they are not all so well known among the medical profession and the laity generally.

1. Malaria is transmitted from one individual to another only by the bite of certain species of the anopheles mosquito.

2. The anopheles mosquito is a wild mosquito and lives and breeds in swamps and thick growths of vegetation.

3. The anopheles mosquito ventures from its swamp habitat for a blood meal only between sunset and sunrise. It will not fly any considerable distance over land not covered with rank growth of vegetation, such as trees, bushes, weeds, etc.

4. When a mosquito draws blood from a person having sexual malarial plasmodia in his blood, under favorable conditions these plasmodia reproduce, giving rise to very large numbers of very small sporozoites.

5. Some of these sporozoites reach the salivary glands of the mosquito and she now is capable of infecting another person. She could not infect before this time. She remains capable of infecting as long as she lives, provided the temperature remains above a certain point—approximately 65° F.

6. A point of very great importance brought out by Dr. Thayer, of the Johns Hopkins Medical School, was that if the mosquito is exposed for any considerable length of time to a temperature below 65° F., plasmodia fail to develop in her and those that have developed die. The season during which the temperature does not drop below 65° F. at any time in the Southern States varies in the different sections. It may be safely stated, therefore, that the length of time during which mosquitoes may serve as hosts for malarial plasmodia does not exceed four to six months, except perhaps in the extreme southern part of the United States.

7. During the other six to eight months malarial plasmodia are kept alive in human hosts, malaria carriers. These are usually those persons who have had malaria in some form during the previous warm season. The plasmodia may give rise to active symptoms of malaria or no symptoms may occur, especially during the cool season.

8. Malarial plasmodia in the blood of man may be either the asexual (schizonts) or the sexual (gametes) form. The asexual form reproduces by segmentation and gives rise to the symptoms of malaria.

9. In about two weeks after an individual has been infected, a part of the plasmodia, instead of making asexual parasites, acquire sexual characteristics and cease to reproduce in the body of man except rarely and under conditions not now well understood. These remain in the blood until they die of old age, in three to six weeks, but they may sometimes reproduce in the blood of the patient, giving rise to a relapse after the patient was supposed to be well.

10. If, however, the sexual parasites are taken into the stomach by certain species of anopheles mosquitoes, sexual activity occurs. In the course of a few days the fertilized female plasmodia, which have already migrated through the stomach wall of the mosquito, give rise, by division,

to enormous numbers of very small sporozoites. Many of these migrate from the abdominal cavity to the salivary glands of the mosquito. They may now be injected by the mosquito into anybody she bites, and thus infection is transmitted.

11. Ordinary quinine sulphate, properly administered, promptly destroys all asexual malarial plasmodia within two or three days. It probably has no destructive influence on the sexual parasites. If quinine is administered before sexual parasites appear (first two weeks), all the plasmodia are destroyed and the particular case does not become a source of infection to others.

If the infection lasts more than two weeks (for lack of proper quinine treatment only) sexual parasites usually develop and the patient is thereafter a source of infection to mosquitoes that bite him.

12. Though quinine will probably not kill sexual malarial plasmodia, it will kill the young plasmodia which they produce, resulting in relapse. Since their life is not more than six weeks, it is only necessary to take quinine properly for this length of time to prevent the development of new plasmodia from them and to allow all the old ones to die out. Unless quinine is taken for this length of time the case is likely to relapse and to be a source of infection to others through the agency of mosquitoes.

All that is required for the complete eradication of malaria is for everybody who had malaria during a warm season to take the proper amount of quinine on each of two consecutive days in each of six consecutive weeks during the following cool season.

If this statement could be brought with sufficient authority to the attention of all the people, and if the importance of everybody's co-operating could be emphasized, the writer's belief is that a vast majority of the malaria carriers would follow the advice given.

Regardless of the most thorough dissemination of this information and the most perfect co-operation, no doubt a few cases of malaria would occur during the warm season. These cases are not a source of infection to mosquitoes until the disease has existed about two weeks. It is very important that thorough and successful treatment of such cases should be applied before they become infectious. Six weeks of proper taking of quinine would insure the harmlessness of these cases. It is important that the laity and also the medical profession should know these facts. Eradication of malaria becomes in fact, therefore, a question of education. Perhaps it may be better said to be a question of dissemination of a very few very simple facts and the co-operation of the entire population to benefit by the knowledge of these facts.

The laity is generally ready to accept and fully appreciate such information provided it is simply stated and not overdone or exaggerated.

A very large part of the population could be reached through the public schools. The important facts relating to the prevention and treatment of the disease could be stated on one, two, or three pages of some

textbook, like, for instance, the third or fourth reader. This should be prepared in the form of a lesson with the advice and assistance of someone versed in pedagogy. It should also meet the approval of some such authority as the Commission for the Study and Prevention of Malaria of the Southern Medical Association. The lesson could be simple enough to be within the grasp of all students above the fourth or fifth grade.

If funds were available and the co-operation of the superintendent of the public schools of a state was given, he would forward to each teacher in the state the necessary copies of the lesson, and *direct* (not suggest) that each student be taught the lesson thoroughly, just as other lessons are taught. It should be taught in all grades above a certain lowest one and probably should be reviewed during each term. Teachers would naturally learn the lesson by teaching it. Many of the children would carry the lesson home to their parents and talk about it at home. No doubt many children and families would take pride in having carried out the instructions and in not being a source of infection.

The lesson could be better taught by the teachers if at the teachers' summer institutes the necessary, somewhat advanced, lecture or lectures and demonstrations on the subject were given. This plan, if carried out throughout the South, would no doubt reach a very large and receptive part of the population.

Another very large part of the population could no doubt be reached through the press of the country. A somewhat more advanced but specific and carefully outlined statement of the matter should be prepared for this purpose. The press generally is ready to publish anything that promises great good to the people, and their co-operation would no doubt be hearty. Practically every newspaper in the entire South would gladly publish this statement of the matter in a conspicuous way and as often as desirable—once a month or oftener. This repeated, conspicuous publication of the facts would result in the entire reading public having the necessary information for the prevention and treatment of malaria.

Another way by which a great deal could be accomplished is through corporations and employers of labor, such as railroad companies, plantation and manufactory managers, etc. Personal and financial interest in such instances would be sufficient to lead to important results if the real truth was known to those concerned. If a plantation or mill manager realized the menace to the health of his employees and even to himself and family, and the actual financial loss from insufficient service that might result from a single case of malaria, his interest would be excited. He would likely see that the person took proper treatment, if he knew what it was. He could require that proper treatment be taken to protect the balance of the force.

The medical profession would be supposed not to require further education on so simple a subject as malaria; but actually it does. It is true that all the best medical schools in the South now give their students

fairly thorough instruction in malaria, but it must be remembered that a good many members of the medical profession in the South were educated in Northern or other schools, and that the majority were educated several years ago when instruction in all branches was inferior to what it is now. No doubt co-operation of schools in malarial sections could be secured to the extent that all would in the future thoroughly instruct their graduating men in the diagnosis and treatment of malaria. They should all know that it is an important duty to their malarial patients to instruct them that, in order to become completely cured and to prevent infection of others or relapses in themselves, they should take quinine properly for six weeks.

It might be possible that some body of authorities on this subject could advantageously draw up a short, concise treatise or lesson on malaria for doctors, which could be required to be learned by all candidates for graduation.

Medical licensing boards could materially assist in insuring proper training in malaria, by regularly asking, on examination for license to practise medicine, a comprehensive question on malaria. It might be well if it was generally known that such a question or questions would be asked on every examination. An applicant would then be sure to prepare himself on the subject.

This proposition to give special prominence to this one disease by medical schools and medical licensing boards in the South is justified by the fact that malaria is perhaps the most common and important disease they will meet in practice. Because of its great prevalence it is to be considered and, therefore, diagnosed or proved absent in almost all cases of fever and in many other conditions.

The proper diagnosis of malaria is very important in the management of the disease in practice. The most modern schools and licensing boards can insure that the future members of the profession are properly prepared on the subject. It would seem, however, desirable to favor and provide for training of the large part of the medical profession who had not the advantage of modern training with this disease. Perhaps this could be done best in some favorably situated medical college where abundant opportunity for clinical and laboratory study of the disease could be provided. Physicians could go and spend a week or two and learn all that is necessary for practical purposes of diagnosis, treatment and final eradication of the disease.

Effort to eradicate the disease along the educational lines suggested would meet with two serious obstacles. First, there would be a few infected people who would not follow the advice given either because they think they know more about the disease than the scientists who have studied it for years, or because they have not enough concern and care for the health and life of themselves and others to take proper treatment. The question would arise whether such persons should not be

managed as we now manage people who have smallpox, yellow fever, diphtheria, etc. They should be segregated until they are no longer a menace to the life and health of others. The second important obstacle would be the importation of cases of malaria from other countries. In the event that we should get sufficiently free from the disease in our own country, there would be the same reason for preventing others from bringing infection into the country as there is for quarantine regulations against introduction of yellow fever, trachoma, etc. As a further protection to the reintroduction of malaria from nearly all tropical countries it might be possible to carry the propaganda of education against malaria to these countries, and thus assist them materially to check the ravages of the disease. The danger of importation into this country would thus be very much reduced.

HOW FAR ARE TEACHERS RESPONSIBLE FOR THE MORBIDITY AND MORTALITY OF SCHOOL-CHILDREN?

By ISAAC A. ABT, M. D., of Chicago.

Diseases among school-children offer an interesting subject for inquiry, particularly in such cases where the morbidity is caused or directly influenced by school conditions.

Recent investigations by school physicians in various parts of the world point to the fact that many children who are suffering from some form of disease attend school. For example, some figures taken from Berlin statistics during the school year of 1906-7 show that 34,880 children were examined, and of these 3,027 or 8.68 per cent. were excluded from school on account of bodily or mental defects. Furthermore, of the 8,176 children who were examined, 23.43 per cent. remained under medical supervision on account of minor diseases or physical defects. The diseases from which the children suffer may be enumerated as follow: General debility, anemia, rickets, scrofula, tuberculosis of the bones, diseases of the heart, diseases of the nose and throat, diseases of the eyes, of the ears, curvature of the spine. It is interesting to note that in Strasburg 90 per cent. of all school-children have defective teeth. It is recognized, too, that carious teeth may lead to infection in neighboring glands and may result in more widespread disease processes.

So far as the mortality among children is concerned, it is well known that the highest death-rate occurs during the first year. After this time the death-rate diminishes, though if compared to that of adults it remains relatively higher. Mortality reaches the lowest point from the tenth to the fifteenth year. In looking over the causes of death in the various statistical tables which are furnished, we find that the children from the fifth to the fifteenth year die, in considerable number, of scarlet fever, measles, diphtheria, croup, whooping-cough, typhoid fever, tuberculosis, pneumonia, diseases of the circulation, and diseases of the digestive tract including appendicitis. It is a fact, long recognized, that the acute infectious and contagious diseases among children, in so far as their frequency is concerned, reach the low point during the summer, a period which corresponds with school vacation, and gradually begin to appear after the opening of the school, reaching the high point during the colder portion of the year, when the school is artificially heated and the windows are more or less closed and the ventilation consequently poor. There are many who feel that the school becomes the distributing point for the acute infectious and contagious diseases. It is necessary,

consequently, that school authorities, boards of health, with the co-operation of parents, should guard against the admission of children who are actually sick, and should exclude from school the children who come from infected homes.

Teachers are frequently in a position to estimate the health condition of their pupils whose appearance often indicates the state of their health. Almost every teacher of experience recognizes as an unhealthy pupil the pale, dull child, who almost involuntarily shirks his school work and avoids physical exertion. She can also see at a glance whether the child is suffering from enlarged glands, whether there is a defect of vision, whether the child has a goitre; and she knows, too, how important it is for the hygiene and health of the child and the school that it should come to class with clean skin, clean clothes, and free from offensive odor.

The teacher may also be an important factor in protecting the health of the child, or in preventing disease by insisting on the proper position of the pupil in reading, and particularly while writing, because it is a well-recognized fact that pupils who hold themselves in faulty position become short-sighted, or those who stoop become predisposed to pulmonary affections and curvature of the spine.

The hygienic condition of the class room is not least in importance so far as the health of the child and prevention of disease are concerned. The cleanliness of the rooms, their ventilation, the heating and lighting, position of the children in their seats, the condition of the seats and desks are matters which are too well known to require discussion; nevertheless, they are of great importance.

School authorities should interest themselves in the water-supply used for drinking purposes. Infectious diseases, such as typhoid and dysentery, are frequently communicated through drinking water. On the other hand, the drinking glass should be banished and the bubbling fountain should be substituted in every school. Children, when entering the school-room, should be directed to clean their shoes and remove the street dirt, thus avoiding the contamination of the school-room with filth and possibly infection. It would be well to require children with wet feet to change shoes and stockings before entering the class room.

Much could be done towards improving the sanitation and hygiene of school-rooms by improving the condition of the floors. Some years ago Dr. Emerson, of Johns Hopkins University, made an investigation of the children's hospitals in Europe. He found that outbreaks of infectious diseases in the hospitals were more common in those institutions which had rough dust-laden and worn wooden floors which were difficult or impossible to clean, than in institutions where smooth floors of stone or linoleum were provided. It is well known to sanitarians that materials, which collect dust and are difficult or impossible to clean, harbor disease germs, and for this reason the floors of school-rooms from the standpoint of sanitation require much attention.

The physical and mental health of the school-child is frequently influenced by the condition of the nose and throat. Enlarged tonsils, particularly those which are diseased, offer a menace to the child, not only on account of mechanical interference with respiration, but also because these glandular structures are subject to recurrent attacks of inflammation. These attacks may lead to infections in remote parts of the body, not uncommonly producing diseases of the heart and kidneys, and also producing attacks of acute rheumatism which are nearly always of serious import on account of the cardiac complications in childhood. The presence of adenoids and abnormal accumulation of lymphoid tissue in the nasopharynx causes obstruction of respiration through the nose and produces secondary symptoms, such as a nasal voice, recurrence of colds and catarrh, frequently a slow mentality, pallor of the skin, earache, or more severe disease of the ear and deafness. Such children will improve in health and will develop more normally if the obstruction is removed.

Those who are suffering from diseases of the ear usually do poor work. Owing to the pain, purulent discharge and deafness, they are inattentive, suffer from headache, and the speech is inarticulate.

Defective sight frequently interferes with the progress of children in school. The writer well remembers a strong, well-developed boy who was brought to him because he was doing very poorly at school. His father had removed him from one school to another because of his apparent inability to learn. He was regarded by teachers and companions as half-witted. On more careful examination it was found that he was suffering from lamellar cataract, a condition which probably occurred as a result of nutritional disease during his infancy. Correction of the visual defect and treatment by an oculist produced the most striking change in the mental condition of this boy, and his improvement in his school work was so marked as to cause surprise to teachers and physician.

So much is expected of the ordinary teacher that it seems almost unfair to ask her to deal with the problem of the nervous child. If we are to make provision for this type of individual in the public school, it would seem that we must revise the system of instruction, either by providing separate classes or smaller classes. Many forms of nervousness present themselves; for example, chorea is a type of disease which not infrequently is a manifestation of rheumatism. The nervousness of these children is often misinterpreted by parents and teachers. They are frequently reprimanded at school and sometimes harshly disciplined at home. These children are frequently irascible, nervous, given to fits of crying, with motor inco-ordination, muscular spasm of various parts of the body. They should be removed from school at the earliest possible moment, kept in bed under the most quiet surroundings, and given skilled medical treatment.

Those who suffer from epilepsy, either in its mild or severe form, should be removed from school and placed in special school homes which should be provided by the state.

There is a group of children whom we designate as nervous children. Frequently they come from neuropathic parents. Very frequently they suffer as a result of environmental conditions. The training has sometimes been neglected by the parents, sometimes been marked by excessive severity, again by coddling and spoiling. This type of children becomes easily fatigued. In proportion to the degree of fatigue they show various symptoms: loss of memory, violent outbursts of temper, or excessive hilarity. Some lose all interest, while others are easily frightened and show great fear; others overestimate their mental strength; another group deprecates itself and underestimates its ability; many show frequent changes in feeling, while some are excessively sensitive, and others are easily elated; a large number show tremor, or coarser twitchings. Disturbances of speech are not infrequent; many speak very rapidly, or seem to swallow syllables, or stutter. Analogous with these disturbances in speech are disturbances in writing; in some cases the writing is very indistinct, or certain letters are omitted, or misplaced.

It has been thought that the infectious diseases, irregular meals or disturbances in the nutrition and feeding during infancy are factors in the causation of nervousness.

The question of fatigue, in relation to the cause and treatment of nervousness among school-children, is one of widespread importance. While it is generally conceded that every individual is subject to mental as well as physical fatigue, it must be admitted that nervous children are most susceptible. Czerny says that in his experience he does not know of a single case where injury has occurred to a normal child on account of overwork. While this proposition may not meet with universal acceptance, nevertheless the following proposition of Czerny will undoubtedly be corroborated by most teachers and physicians. He says all children who seem to have suffered injury from fatigue caused by school work belong to the group of original psychopathics or neuropathics, in whom it may be demonstrated that some neuropathic taint was present before school attendance, probably owing to hereditary conditions and unwise training at home. For excessively nervous children the school is unsuitable, and private or special institutions become necessary. In the milder cases the task is one of correcting the pernicious influences which prevail at home. It is a problem of re-education; teach the little fellow unselfishness, a feeling for the welfare of others, love of truth, and inculcate in him the knowledge that he has duties to perform to others as well as to himself. Frequently, the contact with normal children of the same age, the discipline of the school-room and a strict obedience, which has heretofore been unknown, are potent factors in the correction of the milder cases.

The management of this class of cases is a fine art. The recognition of the exact condition requires a keen insight into the processes of the human mentality. Its correction demands the most thoughtful guidance;

to know how much sympathy, how much severity, how much encouragement to give such a child calls for almost genius itself. How much school work and how much home work should be assigned without causing fatigue is a problem in education and should be considered individually in every instance, and can only be solved by long experience, patient observation and an intimate knowledge of mind in its making.

Tuberculosis is at the present day a very live subject. Strenuous attempts have been made for the last decade to popularize the knowledge concerning the White Plague. It need only be emphasized in this connection that every case of open tuberculosis is a menace to all who come in contact with it. It is only necessary to say that cases of open tuberculosis or florid cases, which are characterized by cough and the production of sputum or by the discharge from tuberculous lesions containing the bacillus, should be isolated. Anyone ill with this disease, whether it be teacher or pupil or janitor or sweeper, should be positively excluded from the precincts of the school-room and the school-house.

But when all is said and done, perhaps we are asking too much of the teacher; we should go further. The system of school instruction should consist of more intimate co-operation of the various forces that are interested in the great problem of education, in race betterment and child welfare. It is asking almost too much of the overworked and underpaid teacher that she should assume the responsibilities of parents and supplant the function of the physician. Here there should be the closest co-operation. It would be well if parents obtained clues from the teachers concerning defects or deficiencies in matters pertaining to the school-life and education of the child. The school physician and the family physician should give aid and direction in all matters that pertain to the preservation of health, prevention of disease, and in the mental and physical training of school-children. If this co-operation could take place the physician would profit because he has much to learn from the teacher and educator; the teacher in turn might gain valuable advice from the medical attendant if he were properly equipped and the advice given in the proper spirit; the parent would benefit frequently because his child would be healthier, happier and better equipped for his school work and his life's work.

In summing up, one feels constrained to say that the teacher in the public school is restricted in as far as the prevention of disease and possibly the death of her pupils are concerned. She cannot easily go beyond the precincts of her school-room. Even here the sanitation and hygiene are not altogether within her province. Certainly she has no jurisdiction over the child at home or at play. She will recognize the delicate child, the nervous child, possibly the one with special sense defects or physical ailments. These children she can report to the parents, to the school physician, or to the family physician. When occasion offers, especially in the cases of older children, she can give brief health talks on the dangers

which occur from infection, the pernicious effects of tobacco and alcohol, the dangers resulting from insanitary homes, improper feeding, unphysiological manner of eating, the necessity of bathing, the health advantage of cleanliness, and one might continue suggesting almost innumerable topics. But to this her power to improve the health of the pupils is limited, on account of the very nature of school conditions. While in most cases she will take a personal interest in the health of each individual child, nevertheless it is almost impossible for her to do more than to offer suggestive advice.

In short, it is the prime function of the school-teacher to teach. It is the writer's own opinion that the final responsibility for the morbidity and mortality of school-children is in the least part to be assumed by the school-teacher. The relation of the school to morbidity and mortality, if there be such a one, must be referred to those higher up: the school system itself, the administrative boards and the highest officials.

As an outsider, one who is not in live touch with educational problems, the writer ventures to say that the modern tendency, which would place everything that would relate to the physical, mental, and moral welfare of a child within the province of the school, is in the line of overtaxing the school with the effect of lightening everyone else's labors and duties. Is it not sound philosophy to say that we will teach our children to think and to play, rather than attempt to crowd into a few years all the facts of the universe, for even if we would try, some must be omitted and many will necessarily be forgotten? To quote the words of a philosopher: "Instruction ends in the school-room and education only with life."

Is it not enough that the teacher should instruct in the three R's, in music and drawing, without asking her to specialize in the teaching of morals, the care and feeding of the baby, the hygiene of the home as well as the school, the chemistry of cooking, the art of sewing, besides being a quasi-physician and an undenominational minister of the gospel? In the meantime the mother is entertaining at the country club, reforming someone else's wayward children, organizing large movements for the enfranchisement of women, while the father is plying his vocations and recreations in directions away from the home and school-house. Let us acquit the teacher in almost every instance of being an accomplice to the demon of disease and death.

PUBLIC HEALTH FOR UNDERGRADUATES IN MEDICAL COLLEGES.

By PAUL GERHARDT WOOLLEY, M. D., of Cincinnati,
Professor of Pathology, University of Cincinnati College of Medicine.

In an address delivered in 1911, Dr. W. A. Evans said: "As I see it, the wise thing for the medical profession to do is to get right into and man every great health movement; man health departments, tuberculosis societies, child and infant welfare societies, housing societies, etc. The future of the profession depends upon keeping matters so that when the public mind thinks of these things, it automatically thinks of physicians. They cannot afford to have these places occupied by others than medical men. A requisite, therefore, is that there should be places where physicians can get training in sanitation, preventable disease and in hygiene, including housing and ventilation. This means a readjustment of medical work."

Dr. Evans mentions places where physicians can get public health training. The writer will refer particularly to undergraduates. At the time the above remarks were made there was a number of places—a small number—where graduates in medicine could get excellent training in public health which would qualify them for health officers. But there was, so far as he knows, but one place where an undergraduate was required to have a practical course in public health—and by practical the writer means a course which would give a student of medicine a working knowledge of common problems in sanitation based upon actual experience of what boards of health do, and why they do it.

It had become perfectly evident to the writer, in the course of a somewhat varied experience in health work, that the current method of teaching 'hygiene' in medical schools was not a modern one. Hygiene, being in reality a laboratory subject, was not taught by the method of observation. Physics, chemistry, biology, anatomy, physiology, pharmacology, bacteriology, pathology, medicine, surgery and obstetrics had, in the course of development, freed themselves, largely at least, from the pure didactic method. It had become evident to teachers that a student to have a working knowledge of practice, in the ordinary sense of the word (*i. e.*, of curing diseases), should also have had a practical experience with patients under the guidance of competent instructors. It is no longer considered possible or proper for a student to try to learn medicine from lectures, though it is conceded that from lectures he learns something. The time has passed when a student can memorize the necessary

facts and practise upon any other basis than that of experience. It had become apparent to medical men, as well as to those of the public who took the trouble to think about it, that Dr. Graves' remark, to the effect that under the old system experience was only acquired at a considerable expense of human life, was true. These things had become so evident that methods have been completely changed, and now a medical student who is graduated from a good medical school has had a fairly large experience. And the tendency is to make him have a still larger practical experience by enforcing an additional year of hospital work (the interne year). There is no doubt that this will be a wise enforcement.

But all this refers largely to the curative side of practice, and in the meantime the preventive side, which is the larger side and the one to which curative medicine should be subsidiary, ethically, has been neglected. This, in a way, is the logical result of conditions, for from time immemorial the general hygienic conditions of communities have been bad and have improved but slowly. And incident to these conditions, disease has always been present, and disease is a more obvious thing than the danger of disease. Moreover, our knowledge of the causes of many diseases, more especially the parasitic, is a recent development; and so, perhaps, in the effort to improve the methods which apply to the older side of medicine, the more modern has been neglected. However that may be, the improvements in the teaching of medicine and the requirements for practice have been made chiefly in the direction of cure, and less systematically in the direction of prevention. And so doctors have been, and are being, trained and graduated from our schools of medicine and sent out into communities, which are hygienically filthy, ignorant and helpless, to cure specific conditions that have been born of the unhygienic conditions; and these graduates are largely unprepared to correct or to cure the general health conditions. The graduates have, most of them, heard from fifteen to thirty lectures on what is called in college catalogues 'hygiene.' A few of them have had some laboratory work in water analysis and perhaps in food analysis. They have been told how many cubic feet of air a single individual requires, and they have heard that closed windows and windowless rooms are evils and a menace to health. They have been told how to disinfect rooms or dwellings and have been oratorically informed that many things are so. But they have never been sent to see what are the effects of too little air, closed windows, or windowless rooms. They have never studied the actual conditions where such conditions exist; they have never done or even watched the process of disinfection. In other words, they have been 'told' hygiene and public health exactly as their fathers were 'told' medicine, and later, in times of epidemic, in their communities they have been forced to experiment with their people until they learned, by luck or the method of Zadig, the answer to their problems, in exactly the same way that their fathers learned to practise medicine. Physicians trained in this way are

the midwives of public health. The real doctors are the sanitary experts and the men who have taken graduate work in organized departments of preventive medicine and public health. The writer's plea is not to make every physician a trained sanitarian, but merely to make him a good assistant to the expert—a useful interne in public health; and, when possible, he would use what has been termed the 'Cincinnati Method,' *i. e.*, the co-operative method.

The conditions in Cincinnati which made it possible to try an experiment in giving a practical course in public health are particularly favorable. The University, of which the Medical Department is a part, is a municipal university supported largely by taxes. Moreover, the University through several of its departments is very actively interested in the affairs of the community. The College for Teachers is engaged in training teachers for the public schools. The Department of Economics acts in an advisory capacity to the administration. The College of Engineering is in part advisory to the Public Service Director, and in it there is a testing department where the materials used in municipal construction of all sorts is done. The Professor of Hygiene in the Department of Medicine is the Health Officer of the city, and the members of the staff of the Cincinnati Hospital are also the members of the faculty of the Department of Medicine.

It was the College of Engineering that furnished us with the object lesson which led us to formulate what we call the 'Co-operative Course with the Board of Health.' For a number of years the students of the College of Engineering had been engaged during alternate periods of two weeks in the factories of the city and suburbs, and in the class rooms of the College. In the shops and factories, they met with problems that had to be solved—and always practical problems—and in the class rooms they discussed these problems both from the practical and theoretical sides, and then tested the theory in the laboratories of the College. In other words, the College of Engineering made use of the factories of the community exactly in the same way that the Department of Physiology makes use of its laboratory and the Department of Medicine makes use of bedside teaching. The factories are the laboratories of the College of Engineering.

There seemed to be no reason why the Department of Hygiene could not make use of the offices and laboratories of the Board of Health in the same way, and therefore conferences were held, and the Board of Health was petitioned to permit students in the Department of Medicine to be taught in that municipal department. In a very short time the matter was arranged largely through the interested activity of Dr. Landis, the Health Officer, Dr. Strietmann, his assistant, and Dr. Fackler, a member of the Board of Health.

Later the Staff of the Cincinnati Hospital for Tuberculosis was interested and the medico-sociological work extended. The schedule has now

been in force for two years and the results are excellent. It is as follows: Junior students who have completed their bacteriology, pathology, and a lecture course in hygiene, and who are engaged in courses in physical diagnosis, serum diagnosis, treatment and clinical microscopy, devote two full days of the first semester (thirty-two days) to the work of the Health Department. During this time they rotate in the various divisions of the department so that each man spends a certain time in the bacteriological and chemical laboratories, in sanitary inspections—in dairy and milk, meat, restaurant, tenement house, bakery and school inspections—and in fumigation work. All this work is done in company with and under the direction of the heads of divisions and their inspectors. This field work is amplified by frequent conferences with the Health Officer and his assistants, at which the general and special tendencies and problems of public health are discussed. The same amount of time (thirty-two days) in the second semester is devoted to an intensive study of one of the great infectious diseases—tuberculosis. During these thirty-two days the student goes, in the morning, to the tuberculosis hospital, where, under the direction of the Superintendent, Dr. Rockhill and his staff, he is assigned to certain cases for study. Of these cases, he makes a careful study—medical and social. He finds out the conditions which surrounded the patient before entering the hospital—the conditions under which he acquired his disease. He studies the patient from the point of view of accurate anatomical diagnosis, prognosis and treatment. In fatal cases the post-mortem serves to prove the clinical records. In connection with these clinical studies the *x*-ray is used, and the application of the *x*-ray is elucidated and demonstrated.

All the work done at the tuberculosis hospital is essentially individual, because the classes are small. Excellent results are therefore to be expected, and as a rule have been obtained.

It seems that such a course should be peculiarly effective in making a student see the problems of public health and in giving him a working basis for later needs. He has seen and taken part in the activities of the Board of Health of a large city. He has used the methods of diagnosis and of treatment of unhygienic conditions. He has seized specimens of milk and graded them. He has seen the dairies and scored them, and finally, he has made an intensive study of one of the most important diseases that is a continual menace to the community. And besides the hygienic side he has had training in physical diagnosis and in the treatment of tuberculosis. He is, therefore, not only well prepared for the medical work of the senior, hospital, and clinic year, but is able to appreciate the social aspects of his patients both in hospital and clinic, and is, accordingly, better prepared to be a real physician.

This plan, as the writer has outlined it, is one which can be adopted in modified or unmodified form by every medical school. It is one which in one or another form may be used with excellent effect by every state

institution. And it should be adopted. The people deserve the best the physician can give them, and they are not getting the best so long as the physician does not understand the general social and hygienic conditions and is not able to deal with them.

A faculty should not worry about the time consumed in such a course. It seems to take two whole days out of every week, when state board requirements make any subtraction impossible. Several medical educators complained to us that we were making room for our course by dropping other required work. But we were not. What we were doing was dropping a number of useless lectures in hygiene, therapeutics, materia medica, and medicine, and substituting for them some very useful, practical, stimulating work in the same subjects. We lost some dead hours and introduced some living ones. And any institution can do the same thing, and will be better for it.

In public health as in other medical fields, "the eyes of humanity are turning slowly, but very surely, towards the man who knows," and the man who knows has had experience.

PUBLIC HEALTH WORK COMPENSATES A COMMUNITY.

By HAROLD B. WOOD, M. D., D. P. H., of Slocum, R. I.

The general public, appreciating the intimacy which exists between the family doctor and his patients, is beginning to realize that its aggregate welfare is very largely under the influence of the activities of the public health officer. With the same intensity of purpose with which the individual consults the doctor, does that practitioner render assistance to the patient. If the patient is untruthful, obscure, misleading or unhelpful to the doctor, he should not expect that he will receive the full benefit from the visit. Only with the proportional amount of confidence and assistance shown him, can the health officer give his full value of service. When the health of a community is entrusted to laymen, that community may be in constant danger of overwhelming disaster.

It is no infrequent occurrence for farmers, plumbers, carpenters, or real estate men to be appointed as health officers. The vaunted excuse given by the people who are responsible for these appointments has been that these men have time to devote to the public health while they also attend to other business. These officials, without any medical training whatever, state that they know measles when they see the rash, that mosquito nets keep out mosquitoes, that when they get a case of diphtheria they can isolate the patient. Such work, however, is not the primal duty of a real health officer. It is for him to detect the unseen case of measles, to know whom to isolate; it is for him to use mosquito netting around the sick people and not around the healthy, and to find the breeding places of the right kind of mosquito; for him to know epidemiology and the various steps to be pursued to prevent disease and to eliminate the carriers. What community can afford to wait until cases of typhoid develop before these individuals receive their appropriate treatment! They deserve their appropriate protection before the outbreak appears.

A large town in the Central West was saturated with typhoid. The residents simply considered the disease as a visitation and accepted it. Open-yard privies were universally used. There was no educated health officer. When newcomers arrived in this growing town they promptly contracted typhoid. This condition existed for years. Within the past two or three years the city has paved its streets. As a convenience, servers were installed, and the typhoid promptly abated. Did the delay pay? If the community did not consider their lives were worth saving, which would have been possible by the expediency of having an efficient health officer, it could have employed a man temporarily. He would have

screened the privies and probably have reduced the infection over 65 per cent., as did Terry in the unsewered parts of Jacksonville.

When a community employs a practising physician as a health officer, his efficiency is largely dependent upon his time, his ability, his energy, and upon the compensation and confidence of the public. A community cannot expect much service without paying for it, but they must be made to understand its importance to their welfare. When dependent upon a poor paying practice, a practising physician cannot be expected to devote much time to a health office which pays less. He should, however, devote the proportionate time. He should give half his time to the public if they pay half his income. The man who works no more than that for which he is paid does not progress. Some men who are wont to term themselves health officers receive a small salary but do no work whatever.

The whole-time health officer is the logical solution. A man with his entire time to devote to the work can produce the results which compensate the people for their expenditure. His cost to the community may be approximately estimated by the saving of the private wage and doctor bills. If the average adult makes \$2.50 a day and his doctor charges \$1.50 a visit, then three such cases of sickness prevented each day may produce a whole-time health officer.

The regular duties of a whole-time officer are more or less definite; his opportunities for work are multitudinous, and depend upon local conditions and upon his ability to foresee a community's needs and to adopt methods of investigation and improvements. Whether he becomes especially active in child welfare, in overcoming the physical defects of school-children, in preventing the transmission of disease, in overcoming sanitary defects or in preventing industrial diseases, depends upon which constitute the greater needs of his local community. Each work is of public importance, but the health officer should through his collection of statistics and through local surveys determine the greatest needs of the community and render the most urgent help.

The efficient health officer compensates a community by his personal public instruction in matters of health and by adopting all modern legitimate means to prevent disease. In an unvaccinated community if he simply talks, preaches and writes vaccination until this protection is universally adopted, he saves that public great expense. Smallpox is expensive, besides being dangerous, disfiguring and demoralizing. In a small outbreak in the West it was estimated that each case of smallpox cost the possessor an average of \$146.00. This included the expense of doctor, medicine and fumigation, and the loss of wage during the attack. Vaccination at \$10.00 would have been cheap for these people. During the outbreak, in a state where compulsory vaccination is not legal, a campaign of education was undertaken in this small town. Photographic exhibits, newspaper notices and school talks induced 600 people to become vaccinated.

If the members of a community pay their doctors for curing them, how much cheaper it would be for the public to employ men to teach their children how to remain healthy and how diseases are spread, and to employ health officers who give public talks, demonstrations and exhibits to show the people how to prevent sickness and to preserve vitality and efficiency! An intensive system of public instruction is a public need, and will soon become a public demand. The value of talks and exhibits has been proved. The value of scientific management is beyond question. Scientific management of health is a proved economy to life insurance companies and to large industries. It is just such an economy for any collection of people of any size—referring either to the size of the collection or to the size of the people. The children in the house should be kept under the scientific management of the family physician; in the school under the charge of the school physician. The poor need scientific health management. Any organization, institution, industry or factory employing a large number of people, should know its returns or losses sustained by sickness among its employees. During the making of 6,800 examinations of the 9,000 employees of a large Chicago house, Mock reports finding 193 cases of tuberculosis and 200 cases of other transmissible diseases.

Employers should adopt scientific health management for their employees so that their home environments, their factory conditions and their methods of work may be investigated and improved, and that thereby there will be better health, more physical endurance and efficiency. Health makes efficiency, and efficiency means work and mutual compensation. It is the duty of the public health worker to produce these conditions.

Before trying to estimate what may be the advantages to be gained by public health work, a community should determine what are its particular needs. These are learned by collecting complete statistics of preventable diseases and deaths. To determine how this local morbidity and mortality can be lessened, definite surveys should be made. By a survey is meant a widespread investigation made to determine what is the particular influence which fosters the damaging result. If tuberculosis produces a high mortality, it is not enough to tell the people only the particular care necessary for the tuberculous sick. The influence of dusty trades or of close confinement, the existence of infected houses, the factor of imported cases, undernourished children and overworked women, must be determined that an effort may be made to conquer this disease. These factors are determined by a survey. With typhoid fever, not alone should the source be discovered and eliminated, but the infected persons should be so guarded that they cannot produce future sources of infection. Where any disease is endemic, the single or multiple distributing points of the infection should be exposed and rapid efforts made to eliminate them. If a contagious disease exists in a school, sanity of control must be exercised. The method of control is determined by knowing the

amount of exposure and the number of susceptible children. Should a case of measles occur in a school-room, it may be advisable to close the room, and it may be of no advantage to adopt that procedure. If there are but two susceptible children in the room, it would be unjust to prevent the attendance of the other forty children. The two susceptible children should be excluded from school after the minimum period of incubation has nearly passed. If there are many susceptible children in the class, the class should be closed one week later, the closure to last for but a few days. It is through the careful collection of statistics of susceptibilities and of physical defects among the school-children, and by the proper use of this knowledge to eliminate disorders, that medical school work becomes a wise and economic investment for any community.

Mortality statistics are not sufficient to determine the medical needs of a town or county. They do not determine very accurately the extent of any particular disease. The ratio of deaths to cases may be low, and therefore the absence of deaths does not prove the absence of the disease. There may be no deaths from smallpox, but that does not prove that there are not many cases, that the monetary loss is not great, or that the people are well vaccinated.

Accurate reports of all cases of preventable diseases, and of all diseases of which the influencing factor can be controlled, are needed. The doctors may be painstaking and report their cases, but licensed physicians do not see all the cases. It remains for the health officer to search for these. In a western town, where the doctors were generally careful about reporting cases, it was determined that they reported but 33 per cent. of the actual cases of diphtheria, 31 per cent. of the measles, 58 per cent. of the smallpox, 73 per cent. of the scarlet fever during the past year. Of the unreported cases the physicians saw scarcely any, yet these therefore became the most dangerous carriers.

It is by the practical use of complete statistics of community life, and health and labor, that the health officer becomes an asset to the public which has a right to expect much.

INSPECTION NO CINDERELLA.

By OSCAR DOWLING, M. D., of Shreveport, La.,
President Louisiana State Board of Health.

Among health authorities there is a steady advance in the adoption of the policy of publicity. The old way was to conceal; the new to reveal. Equally, the public is beginning to endorse this policy as safe and sane and beneficial. The changed attitude is in harmony with the radical revolution which has recently developed in all modern activities. It is beginning to be understood in the commercial world as well as in the ethical that confidence won can be relied upon; that distrust is hydra-headed and not to be downed.

If the public were entirely convinced of the wisdom and the advantage of this policy the efficiency of public health service would be greatly increased. But while many agree, as yet by far the larger number cling to the traditional order.

To increase the number of those convinced is an obligation. The means are numerous. One of these—inspection—is of paramount importance. A few years ago, inspection of foods received an impetus from the revelations of the atrocious frauds practised by many engaged in supplying the public with meat products. Later, other foods were brought into the public eye as adulterated and unfit. The interest for a brief period was intense and well-nigh universal, but widespread, effective reform cannot be claimed as a result.

Sanitary inspection has been regarded somewhat as a Cinderella in health work. It has been shifted to those most incompetent in the service; it is thought even now by many to require little training and less intelligence. The public thinks of it as relating to some nuisance, such as a dead cat in the alley, a defective septic tank, or something equally unrelated to the community welfare. That its merit is not better understood is because the work has not been done systematically, intelligently and thoroughly. Sanitary inspection, including inspection of foods, methods, and environments, gives opportunity for the most effective health lessons within the purview of the department's activities. It implies elements of disease prevention and public and personal hygiene. It appeals from the point of view of individual advantage both to the producer and the consumer.

The barber, whose shop is intelligently inspected, learns, perhaps for the first time, that unsterilized instruments are unsafe; that he should wash his hands thoroughly after waiting on each customer; that certain dis-

eases are easily communicable, and that the styptic stick is under ban. He may never carry out one of the rules regarding these details, but he will think of them, one or more, every time he shaves a customer. The chances are he will do some of the things directed. If there happen to be patrons in his shop when the inspection is made, it is almost a certainty that he will make a show at improved conditions.

The same may be said of the baker, the butcher, and others whose living depends upon public patronage.

In public buildings janitor service is largely of the 'lick-and-promise' order, and it seems not to occur either to officials or to those employed that such negligent work is dishonest. The idea seems to obtain that wages paid from the public purse are not to be earned. The official in charge does not like to have his management adversely criticized; he cannot afford it; so again, more or less, dust, cobwebs, the insanitary lavatory or other unhealthful conditions pointed out get on his official nerves, and before the next visit there is sure to be a brave attempt at a general cleaning.

Among these three classes, typical of the public service, and others, interest in betterment is the part of wisdom, for it means self-protection.

The second element involved—the public—is reached through the same motive. It is an indifferent community indeed which will not heed the findings of the inspector if they are of the character that menace health. There are some who believe that 'fuss' about dust and flies on food-stuffs is simply because the health officer wants to 'play' that he is earning his salary. But many times these are the ones who are 'hit.' There are some who would rather not know that the men in the bakeries, dripping with sweat wear no shirts, and that the man who handles the meat in the market has his head tied up because of an 'old sore'; happily these unhygienic-minded are becoming fewer. In the main, people have been too absorbed to note conditions; besides, it was nobody's business to investigate, and, therefore, nobody knew, or, if somebody did, it was not 'up to him' to antagonize his neighbor or the man whose vote he counted on for his own or the party's welfare. At present, a partially convinced public welcomes the officer who has the intelligence to see and the nerve to reveal conditions inimical to health.

In common with the individual, the community does not take up hygienic reform with any great haste, or show overwhelming zeal in remedial measures; but to a degree the danger of insanitary conditions will be sensed and the requirements approved. Following knowledge slowly comes wisdom which in this case means activity.

One of the interesting phases of inspection is the goodwill of those whose establishments are criticized and found lacking. In the experience of the past six months, during which period over seven thousand inspections have been made, in reply to letters sent to individuals, 95 per cent. have replied in a friendly spirit and with assurances of readiness to

comply with the law. Even those resentful at first take a pride and pleasure in writing that the requirements have been met.

It is astonishing how many intelligent citizens are ignorant of the forces arrayed for their protection. Many have no idea of the functions of 'boards'; some do not know even of the existence of these, especially the board of health; while many who do know have most erroneous notions of their powers.

Food, sanitary, and school inspection, therefore, is a lesson in civics sorely needed in many localities and by many individuals.

So long as this form of health service is poorly done it will be without respect. The first requirement for lifting it to its proper place in the public mind is to employ only those who are trained for the work. A smattering of the Code, a notebook and a badge are not sufficient equipment. The food and sanitary inspector, in addition to a knowledge of the law, and in the case of food, the subject in all its aspects, should have tact, sense, judgment, an open mind and a spirit of kindness. Whenever the welfare of the individual is touched, he has a right to individual personal consideration. Every case of inspection stands on its own merits; it admits of no comparison. This should be fundamental in the inspector's mind and the cardinal principle of his philosophy. Second to this is freedom from the tendency to see violations only. It is fair and just, and for the inspector the only permissible policy, that he be awake equally to excellences as well as defects. When the inspection is done by men of this type, followed with supplementary instructions, and credit given for improvements made, the public will be entirely convinced of the necessity and efficiency of this division of health work.

THE PRACTITIONER IN HIS RELATION TO PUBLIC HEALTH QUESTIONS.

By ISADORE DYER, Ph. B., M. D., of New Orleans,
Professor of Diseases of the Skin, and Dean of the Tulane School of Medicine,
New Orleans.

The study of medicine, as ordinarily interpreted, would scarcely be considered as training doctors for public life, yet many do gravitate into the state legislatures and occasionally rise to higher positions. In foreign countries it is no unusual thing to find the physician among the closest advisers in governmental problems, and in our South American and Central American republics the physician now and then heads the government. He has a tendency then to statesmanship and statecraft. It is all the more difficult to understand, therefore, why the physician, as a rule, takes so little interest in public health questions. If this statement were submitted to him, he would object to the calumny, but it is none the less true. The statistical relation of the Census Bureau in Washington shows conclusively that the average medical man has to be coerced in the matter of vital statistics and that his records are not usually open to much critical scrutiny.

The average doctor is satisfied to lead a life of limited, or rather restricted usefulness, meeting only the obligations which mean healing the sick, and leaving, without conscience, all matters of public health to those who may be called the constituted authorities.

The education of medical men in the years gone by is largely responsible for this. No obligation was suggested, even remotely, in the medical course. Ethics are not taught as a part of the curriculum, and the average medical student began and completed his education in the medical college without any knowledge of the term.

Even to-day in any community, large or small, there are few medical men who are interested in public health questions, even when laid at their door.

With the inauguration of laboratory instruction in hygiene and preventive medicine, and with the broadening of the instruction in hygiene, the younger generations coming along will bring new ideas into their communities and older men will be forced to a more active concern.

Public health means the education of the public in preventive medicine as well as it may mean the care of the sick; and we must look to it that in the future every physician must become a guardian of the public health within the jurisdiction of his own practice. Many small things mentioned in a casual visit may lead to a correction of household neglect of health,

and after a time every household will practise the sanitation learned first hand from the intelligent and conscientious physician. The observance of habits in diet, general and personal hygiene, household sanitation, are all points on which the intelligent and sympathetic family physician may be able to help with timely advice; and if we add the simple rules of infant care, the milk problem, the feeding, fresh air, etc., the field grows in its importance.

The child welfare movement grows daily in our country, and its possibilities are hard to estimate if the whole scope of the movement is contemplated. It needs more than newspaper publicity and public meetings to do any good. Even the humanitarian workers among the poor will find a hard problem, but one which may be made easier if the physician will lend a helping voice in advice and information.

The schools need revision; the modern conception of education of the masses provides a system which educates groups of children along the lines which provide for all a basis of credit and of instruction estimated by the merits of the average scholar or, more often, the most unqualified or weakest in the classes. A revision of school methods is afoot, and public health is concerned in eliminating these defective delinquents, or exceptional children, from regular school instruction. The physician can help by anticipating the action of school authority or medical inspectors by recognizing the child at home, before he or she goes to school.

Criminology, the eleemosynary institutions, the very streets are full of problems waiting for the physician to solve; and, as the years go by, the place of the physician in relation to public health questions must grow more and more in importance.

MEDICAL AND SURGICAL PROGRESS.

THE PREVENTION OF SPEECH DEFECTS IN CHILDREN.

A REVIEW OF RECENT LITERATURE.

By WM. B. CHAMBERLIN, M. D., of the Editorial Staff.

1. Bell: Visible Speech. (*Volta Review*, p. 406, November, 1912.)
2. Brown: Consideration of Speech Defects. (*Journ. Amer. Med. Assoc.*, p. 1417, May 28th, 1904.)
3. Caldwell: The Tongueless Ones. (*Volta Review*, p. 65, May, 1912.)
4. Fletcher: Speech Defects in Children. (*Amer. Journ. Obstet. and Dis. of Women and Children*, p. 176, January, 1912.)
5. Goldstein: Practical Value of Lip Reading. (*Laryngoscope*, p. 619, May, 1911.)
6. Horn: Responsibility of the General Practitioner to the Child with Speech Defects. (*Cal. State Journ. of Med.*, January and February, 1912.) *Ibid.*: Selected Chapters in the Study of Speech Disturbances. (*Cal. State Journ. of Med.*, January and February, 1912.)
7. Makuen: Teaching of Speech and the Correction of Speech Defects in Deaf and Hearing Children. (*Volta Review*, p. 408, November, 1912.) *Ibid.*: Some Obstructions to Speech Development. (*Laryngoscope*, p. 993, October, 1911.) *Ibid.*: The Essentials of Speech Production. (*New York Med. Journ.*, September 5th, 1908.) *Ibid.*: Physiology and Psychology of Hearing with Special Reference to the Development of Speech. (*Laryngoscope*, June, 1910.) *Ibid.*: Defects of Speech and Voice. (*Amer. Journ. Physiol.*, January, 1908.) *Ibid.*: Retarded Development of Speech in Young Children. (*Penn. Med. Journ.*, June, 1905.)
8. Montague: Why It Was W-on-the-Eyes. (*Atlantic Monthly*, April, 1913.)
9. Scripture: Treatment of Negligent Speech by General Practitioner. (*Med. Record*, p. 257, August 15th, 1908.) *Ibid.*: Care of Speech Defectives. (*Med. Record*, p. 339, February 22nd, 1913.)

"Language and thought are inseparable," says Max Mueller; "To think is to speak low; to speak is to think aloud." Defects of speech may be divided into three great groups: (1) Stuttering, (2) stammering and (3) deaf-mutism, congenital or acquired. Stammering and stuttering are usually confused among the laity, and even among physicians the terms are used rather loosely or even synonymously. As a matter of fact they apply to two entirely separate and distinct conditions. Stuttering

is a lack of co-ordination between (1) the central mechanism of control, (2) the mechanism of respiration, (3) that of phonation, and (4) the mechanism of articulation. Stammering is a defect of pronunciation. Deaf-mutism may be divided into the congenital, when the child is deaf when born, and (2) when he becomes deaf subsequent to birth and the power of speech though acquired is quickly forgotten.

Horn says that in San Francisco 1 per cent. of school-children stutter, while 10 per cent. have some form of speech defect. In the consideration and attention given to these defects he compares the loose and haphazard methods of the Americans with the attention given these unfortunates by the Germans. The condition is all the more pitiable from the fact that over 50 per cent. of these difficulties are preventable. Speech is really more important to the developing child than any one of his special senses. Its importance to the adult, from an economic standpoint, can scarcely be overestimated. In this country the care and treatment of these unfortunates, instead of being carried on or supervised by the city or state, is given over almost entirely to charlatans or quacks with some wonderful, and usually secret, method. These charlatans succeed in certain cases, but in the main their efforts are unsuccessful or productive of only transient cures. Stuttering is due to a lack of co-ordination, to the inability of the various mechanisms of speech to keep up with the train of thought. Consequently the phlegmatic child rarely stutters. The complete imbecile does not speak at all, while the half imbecile stammers, but rarely stutters.

Among the causes of stuttering and stammering he mentions first of all the influence of environment. When one considers the wonderful imitative faculty in children, the importance of this becomes at once apparent. One stuttering child may influence or contaminate a large proportion of the children in a school-room. It is necessary, therefore, as in contagious diseases, for the development and safety of the others that such a child should immediately be segregated until the defect is cured. Among other causes he mentions the influence of nervous diseases, especially at the second dentition and the age of puberty. Infectious diseases, too, play an important part. Over 50 per cent. of stuttering children have adenoids and enlarged tonsils. He states as an axiom that "one who speaks correctly cannot stutter." The converse of the proposition also holds good, that if we teach a stuttering child to speak correctly he will cease to stutter.

Out of 1,000 cases Gutzmann reports 87 per cent. as cured, 10 per cent. improved, and only 3 per cent. failures. He lays down the following rules for the treatment of stutterers and stammerers:—

(1) The model from whom the child copies must be as perfect as possible.

(2) On account of the acute power of imitation the developing child must be protected from contact with those having imperfect speech.

(3) Observe the physical sequence of consonants in teaching a child to speak. The difficulties increase from those formed by the lips and tip of the tongue to those formed by the back of the tongue and the roof of the mouth. This is the same in all languages and among all nationalities.

(4) The gradual development of the child should be watched with unrelenting care.

Among the best exercises in training the defective child is that of stories, read slowly and followed by questions and answers, thus inducing the child to repeat the story in his own words.

Scripture calls attention to the fact that in a goodly number of cases the cure of speech defects is very easy, but in the vast majority it is extremely difficult. He dwells upon the necessity for expert attention, inasmuch as the diagnosis in many cases can be made by no one less thoroughly equipped, and also regrets that instruction in America is so completely in the hands of quacks and charlatans. There are only two places where undergraduate instruction is given and no place at all where post-graduate training may be had. Brown dwells upon the same point and urges the correction of any or all abnormalities and the following of this with proper respiratory and vocal exercises. There is no trick or method that is applicable to all cases.

Fletcher cites the statistics of Couradi. Of 87,440 children, 2.46 per cent. had speech defects. This proportion, applied to the children of the United States, would give a total of 430,000, outnumbering the blind, insane and deaf-mutes three to one. He insists that "no child with a defect in speech should ever be allowed in any school-room, except one in which there is a teacher specifically trained to care for his special kind of defect. One such child becomes a menace to the health, success and happiness of all the rest." He calls attention to the epoch-making work of Gutzmann in Germany, where since 1886, largely as a result of his efforts, more than 1,000 teachers have been sent to Berlin for training at public expense. "We," he says, "are alone among the civilized nations of the world in leaving this vast field to the quack, the charlatan and the unscientific man with a method."

Among those who have labored long and earnestly in this country in the prevention and correction of speech defects, Makuen, of Philadelphia, stands preëminent. This is evidenced not only by the numbers of cures resulting from his painstaking efforts, but by the abundance of the literature from his virile pen. "Good speech," he considers, "is absolutely necessary to the mind's normal development." The mechanisms of speech he divides first of all into the central and the peripheral. The peripheral are the respiratory, the phonatory and the articulatory mechanisms. The most important obstruction to normal speech development is first of all any defect in the ear. "The child speaks the language which he hears and any defect of speech suggests a defect in hearing." Other defects he groups under those of the (1) thorax, (2) the larynx and (3) the numerous irregularities of structure and pathological conditions in the mouth, pharynx and nose. He, together with most other writers, dwells upon enlarged tonsils and adenoids as being among the main causative factors. "All speech training, therefore, whether the defects be on account of deafness or on account of the thousand and one other things that may impede its development, must be carried on simultaneously with psychical training. Speech training consists, after all, only in an effort to help the individual by means of the development of the higher intellectual centres of his brain, himself to control and train his lower speech centres, and thus through them the peripheral mechanisms of speech. All children should have a certain amount of speech training, and thus not only would the expression of thought be placed on a higher plane, but that portion of the brain which manufactures thought would be itself more highly developed. Defective speech is naturally suggestive of defective mentality, and defective mentality is always accompanied by defective speech."

Makuen insists also upon the importance of the visual and tactile centres, in addition to those of hearing. Blind children are proverbially

slow in the acquisition of speech, and by those not deaf many words are lost when the eyes are closed. "Without the sense of touch we can have no kinesthetic centres whatever and the acquirement of speech would be quite impossible."

Goldstein in a timely paper in the *Laryngoscope* urges the importance of lip-reading. He dwells upon the value, not only for deaf-mutes, but also for those becoming deaf in later life, after the power of speech has been acquired. He mentions on one occasion having conversed for several hours with a young lady and not having learned until afterwards that she was profoundly deaf. She had mastered speech reading in less than two years, and in addition to English was familiar with German and French. The method is not a new one, but Goldstein with others feels that it is not accorded the attention and importance which it deserves. He looks upon this method as the one ray of hope which the otologist can hold out to those afflicted with progressive forms of incurable deafness. Bulwer in 1648 refers to "that subtle art which may enable one with an observant eye to see what any man speaks by the moving of the lips." Records show that the method was employed in Europe as early as the sixteenth century. In America, Braidwood instructed in lip-reading in Virginia in 1812. Goldstein believes the difficulties in its acquisition have been greatly overestimated. The principles can be easily acquired in six months and proficiency in one year's practice thereafter. In other words, one should become expert in from one to two years after the beginning of training.

For a most pathetic comparison of the method of lip-reading with that from the alphabet made with the fingers, the reader is referred to a story in the *Atlantic Monthly* for April, 1913, entitled "Why It Was Won-on-the-Eyes." In this story the method of lip-reading, recently introduced into the school, was vigorously opposed by one of the older teachers devoted to the older method. She is only converted when she sees a small boy, a deaf-mute, conversing for the first time with his mother, who is totally blind. Never before had mother and child been able to communicate with each other.

The reader is also referred to the very commendable society, called the Volta Society, with headquarters in Washington and their most excellent publication, the *Volta Review*. This society is purely philanthropic, its object being to forward the method of lip-reading and to ameliorate the condition of the deaf in the United States.

HYGIENE OF INFANCY AND CHILDHOOD.

A REVIEW OF RECENT LITERATURE.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Baker: Reduction of Infant Mortality in New York City. (*Amer. Journ. Dis. Children*, February, 1913.)
2. Van Ingen: Neglected Aspects of the Problem of Infant Mortality. (*Amer. Journ. Obstet. and Dis. of Children*, p. 1257, June, 1913.)
3. Waldron: Milk Stations or Infant Mortality. (*Archiv. Pediatrics*; April, 1913.)
4. Lederle: Reduction of Infant Mortality. (*Amer. Journ. Obstet. and Dis. Children*, p. 157, July, 1913.)
5. Editorial: *Cincinnati Enquirer*, July 20th, 1913.
6. Lee: The Wet-Nursing of Foundlings. (*Archiv. Pediatrics*, July, 1913.)
7. Davis: Statistical Comparison of Mortality of Breast and Bottle-Fed Infants. (*Amer. Journ. Dis. Children*, March, 1913.)
8. Allport: School Hygiene. (*Archiv. Pediatrics*, June, 1913.)
9. Editorial: Out-door Classes for Tuberculous Children. (*Journ. Amer. Med. Assoc.*, Vol. LIX, p. 1206, 1912.)
10. Placak: Open-Air Schools of Cleveland. (*Cleveland Med. Journ.*, p. 717, 1912.)
11. Howell: The Mental Defective and Society. (*Archiv. Pediatrics*, March, 1913.)
12. Johnstone: Relation of the Defective to the Public Schools. (*Archiv. Pediatrics*, August, 1912.)
13. Smart: The Physician and the Mentally Defective Child. (*Amer. Journ. Obstet. and Dis. Children*, p. 1251, June, 1913.)
14. Training Teachers of Exceptional Children. (*Archiv. Pediatrics*, p. 652, October, 1912.)
15. Smith: Cases of Mental Deficiency. (*British Journ. Dis. Children*, June, 1913.)
16. Clark: Psychologic Clinics in the Public Schools. (*Archiv. Pediatrics*, 1912.)

Medical literature is filled at present with discussions of the problems of the hygiene of infancy and childhood; and, without attempting the impossible task of a complete summary, it seems of interest to review some of the salient features. The question of the reduction of infant mortality occupies, as it justly should, an important place in modern preventive medicine. In a very interesting paper on The Reduction of Infant Mortality in New York City, S. Josephine Baker points out that in the consideration of this question "there is often danger in placing too great emphasis on methods in their relation to results."

Transitory reductions in the infant death-rates are not uncommon, and

temporary increases may also occur. In general, in New York City the decline of infant mortality rate has been regular during the past three decades. During the thirty-year period from 1880 to 1910 the rate declined from 288.9 to 133.9 per thousand infants under one year of age.

A reduction of 70 per cent. in the contagions, 37 per cent. in the diarrheal diseases, 38 per cent. in the respiratory diseases was effected.

The Department of Health of New York City states, as a fundamental precept, that "public health is purchasable; within natural limits a community can determine its own death-rate." This is a truism which is now being recognized as such the world over.

Among the agencies used in New York City the following may be noted.

In 1908 there was created the Division of Child Hygiene of the Department of Health. This department established milk stations combining their efforts with those of private individuals and societies. Seventy-nine milk stations were thus established. In co-operation therewith the division of child hygiene employed 157 trained nurses making home visits—the nurses each being responsible for babies under their supervision.

A campaign of newspaper publicity was inaugurated. Little Mothers' Leagues were formed where girls from twelve to fourteen years of age were taught all practical methods of baby hygiene and feeding.

At present the work has been greatly systematized by the formation of a central Babies' Welfare Association, which, working through sub-committees of various kinds, has secured a much more thorough control of the situation than had heretofore been possible.

At the present time it is estimated that of 135,000 babies in New York City, 50,000 have mothers completely ignorant of even the simplest rules of infant hygiene. The Division of Child Hygiene and its allies have 44,000 of these babes under control.

Baker calls attention to the fact that the two most important problems to be solved at present are the reduction of infant mortality from so-called congenital causes and among institution babes. In New York City 35 per cent. of the deaths under one year of age are due to causes mainly dependent upon the health of the mother during pregnancy and confinement. Again, it is noteworthy that in 1910, the institution death-rate of babes under one year of age furnished 42 per cent. of the total in the Borough of Manhattan.

Van Ingen shows that there has been practically no reduction in infant mortality of infants in the first weeks of life. The distribution of deaths of infants under one week is practically uniform throughout the year. He emphasizes the need of help to and education for expectant mothers in the poorer classes. Both in New York and Boston such work is now being started on a small scale, with very gratifying results. Sir George Newman's dictum is worth noting: "The problem of infant mortality is not one of housing or of sanitation or indeed poverty as such, but is mainly a question of motherhood."

In a discussion of the value of milk stations given with statistical detail, Waldron truly says: "Milk stations do not mean simply pure milk, but a combination of good milk, a capable matron to handle it, a place for mothers to bring strong babes to keep them strong, or weak or sick babies, a nurse to meet them and return to the home to treat the sick baby and teach the mother how to care for and feed the infant, and a physician to oversee, direct and encourage all. This is what a milk station

is in a thickly populated section of a city. Leave any item out and the success of the station decreases."

Discussing the plans of the Department of Health of the City of New York, the Commissioner, Dr. E. J. Lederle, calls attention to the fact that the Babies' Welfare Association now includes 80 different organizations with a central clearing house and bureau of information. In addition to specific preventive work, the efforts of the department are constantly directed toward raising the sanitary qualification of New York's milk supply.

There can be no doubt that the question of infant mortality bears a direct relation to the quality of the milk supply. In this connection the report of Federal Government inspectors is of interest: "A striking illustration of what milk inspection has done for Cincinnati, is given in a report made public by Federal investigations to-day. The probe into the milk problem in the Queen City shows that the percentage of adulteration decreased from 62.6 per cent. in 1908, before a milk inspection department was opened, to 8.3 per cent in 1912 and 6.2 per cent. in 1913. Infant mortality fell 33 per cent."

Lee has recently reported good results from the plan of the Children's Aid Society of Philadelphia. This society has organized a bureau and a directory of wet nurses to care for the wards of the society. The women nearly all were able to nurse two children, their own and another. Davis, Vital Statistician of the Boston Health Department, contributes a detailed statistical comparison of the deaths in artificially and breast-fed infants. The following statement is significant: "Of infants reaching the age of two weeks, one in five dies before a year old if bottle-fed, while if breast-fed only one in thirty fails to reach the one year mark. This means that the death of these infants would be 60 per cent. less if all could be breast-fed."

The question of school hygiene is receiving much attention at this time. We are beginning to recognize that nations may be strengthened intellectually, physically and morally by improving and increasing our educational facilities through the avenue of placing school-children in a better physical condition. Allport has collected some statistics concerning the public schools of this country. He says that there are 20,000,000 school-children (20 per cent. of the population) and that 75 per cent. of these children are suffering from some partially or completely remedial defect which is more or less interfering with their physical, mental and moral advancement: 500,000 have organic heart disease; 1,000,000 have spinal curvature, etc.; 1,000,000 have tuberculosis; 1,000,000 have defective hearing; 5,000,000 have defective vision; 5,000,000 have malnutrition; 6,000,000 operable tonsils and adenoids; 10,000,000 have defective teeth. 70 per cent. of the deaths in the United States are due to contagious and epidemic diseases that could in most instances be controlled and suppressed by proper medical school inspection.

Into the multiplicity of details concerning modern school hygiene this is not the place to enter. The problem of tuberculous school-children is receiving much attention, and the open-air school undoubtedly seems to offer at least a partial solution. In New York City where a careful system of control and examination of these children has been instituted, it has been shown that striking results are obtained. Physical and mental improvement has been the rule. In one class over half the children advanced in their school work faster than the normal rate. Control examinations showed marked physical gains of the fresh air children as

compared with children of apparently the same type in the regular classes. The successful management of fresh air classes is an excellent illustration of the beneficial results of the application of modern medical science to practical hygienic and eugenic problems.

Similar results have been obtained wherever such open-air schools have been instituted and properly conducted.

One phase of modern school hygiene, in the larger sense, which in recent times has assumed considerable importance is the problem of the mentally defective child.

Howell's investigations have convinced him that a conservative estimate would give 1 mental defective to 300 normal persons in the United States. This means that there are over 300,000 mental defectives in the country. Incidentally Howell insists that sterilization of these unfortunates by state law should be enforced, as the most valuable prophylactic therapy.

In a very suggestive paper Johnstone discusses the problem of the defective child. He starts from the premise that the time has come for the commonwealth to recognize that every child is entitled to such education as is best suited to its needs. Now, theoretically, the feeble-minded should be sent at once to state institutions. In practice this is an absolute impossibility. Thus (1) the state cannot afford properly to provide for all of its feeble-minded and epileptics; (2) the citizens of the state cannot afford not properly to provide for all of its feeble-minded and epileptics. Johnstone suggests this solution: "Continue to extend the medico-psychological examinations. Establish special classes as rapidly as possible, placing in them all who are unable to keep up with the normal pupils. Reclassify in the special classes as the conditions warrant, but receive all feeble-minded children of school age excepting those of such low grade that they cannot be kept in school. When it is found that these children are becoming old enough to be sexually dangerous, they should be transferred from the special classes to a training institution. All of this should be under the general control of the educational system, and, until the last step mentioned above is taken, the cost of housing, feeding and general maintenance will be borne by the parents."

It is worthy of note that the greater part of work in reference to the care of the defective child has been done not by the physician, but by the layman. Commenting upon this state of affairs, Isabelle T. Smart calls attention to the fact that the general practitioner has not given the subject the consideration which it demands. She and other observers maintain that the consequences of retarded development or even of a temporary arrest of development, in some slight particular, are all too little appreciated by physicians.

It is, of course, easy to see that the training of exceptional children cannot be left to chance if we are to get results. It is necessary that teachers be trained specially for such work. Special training schools for such teachers have already been established, both in this country and abroad. It may be worth noting that there are special summer courses for teachers in this work. The one at Vineland, N. J., has been running for several seasons, and another has been established by the National Association for the Study and Education of Exceptional Children. Smith offers a classification of cases of mental deficiency which will be of interest to those working in the subject.

Clark calls attention to the need for psychologic clinics in our public schools, not only for the recognition of subnormal children, but also for

the education and training of the neuropathic child. The neurotic child-group is the embryo storehouse of the adult psychoneuroses and the near-invalidism of later life. The extreme difficulty of correcting psychoneuroses in later life in the non-elastic and non-recuperative periods is well known. Psychologic clinics should therefore be an integral part of the school system everywhere. Any line of therapy laid down for the neuropathic child must be largely an educational one, and school clinics, already enjoying parents' confidence, can easily be made to include such work. In such psychologic clinics there is need and opportunity for team work for psychologists, neurologists, psychiatrists and sociologists.

IMPROPER SCHOOL SEATING AND SCOLIOSIS.

A REVIEW OF RECENT LITERATURE.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Gould (*American Medicine*, Vol. VII, No. 13, 1904; *ibid.*, Vol. IX, No. 14, 1905; *Med. Record*, April 22nd, 1905).
2. Kirsch (*Deutsch. med. Wochenschr.*, Vol. XXXIV, No. 30, July 23rd, 1908; *Archiv fuer orth. Chir. und mech. Unfallchir.*, Vol. VII, Nos. 1 and 4).
3. Gronberg (*Zeitschr. fuer orth Chir.*, Vol. XVIII, Nos. 1 and 2).
4. Lagrange (*Archives de méd. des enfants*, No. 7, 1908).
5. Hutinel (*Gazette des Hôpitaux*, No. 12, 1908).
6. Dukes (Sec. International Cong. of School Hygiene).
7. Scholder (*Archiv fuer orth. Chir. und mechan. Unfallchir.*, Vol. VII, Nos. 1 and 3).
8. Silfverskjöld (*Hygiea*, Stockholm, Vol. LXVII, No. 1).
9. Shanz (*Zeitschr. fuer orth. Chir.*, Vol. XVII).
10. Tait McKenzie: Exercise in Education and Medicine. 1909.
11. Lovett (*Lancet-Clinic*, May 4th, 1912; *School Hygiene*, October 3rd, 1908).
12. Muskat (*Archiv fuer Kinderheilk.*, Vol. XLIX, Nos. 1 and 2).
13. Haglund (*Zeitschr. fuer orth. Chir.*, Vol. XXVI, p. 649).
14. Wood: The Desk. (Sec. International Cong. of School Hygiene).
15. Cotton (Annual Report School House Commission, Boston, 1903-04).
16. Sever (*New York Med. Journ.*, February 8th and 15th, 1913).

Lovett says that there has been in the past a general tendency to regard scoliosis, or lateral curvature of the spine, as a deformity largely associated with school life, and that there has been a disposition to regard improper school conditions as the cause of much of the lateral curvature seen among school children.

In 1910, the German Orthopedic Association held a symposium on the question of the relation of scoliosis to school life. The views expressed here agreed on the whole with the opinion that school life has received too much blame in the matter, and that scoliosis of any more than a very mild degree was not likely to be caused by school conditions.

Lovett points out that the term scoliosis covers more than one type of spinal deviation, and that in the consideration of scoliosis as depending upon a school seat there has been little differentiation between the three recognized types of lateral curvature. On the other hand, it is obvious that the use of improper and ill-fitting seats and desks will predispose to improper attitudes.

Again, there has been a tendency to blame the teaching of slanted writing for too much of the bad attitude assumed by the pupils, and

statistics have been reported in favor of the vertical system of writing. They are as follows:—

	Percentage of Scoliotics	
	In slanted writing	In vertical writing
Nuremberg.	24	15
Zurich.	32	12
Munich.	24	15
Fuerth.	65	31
Wuerzburg.	28	8

Gould, of Philadelphia, has called attention to some interesting factors regarding the influence of vertical and slanted writing on the pupil's position: "With the head and body erect, the paper straight before the median line of the body, and the penholder held as commanded, no person can or will write, for the simple reason that the writing and the writing field about the penpoint are hidden by the writing hand and the penholder. Immediately the pupil skews the paper, tilts the head to the left, and grasps the holder differently, all in order to bring the writing field and letters being made into clear view, and especially of the right or dominant eye. The slanted handwriting is due merely to the fact that less torsion or rotation of the head to the right is rendered necessary, and a slight easing is secured by slanting the letters to the right."

Lovett says that bad air, fatigue and school life under poor general conditions, improper furniture and twisted writing position favor bad attitude, and that the more constantly these factors are in operation, the more effective will be their results in producing scoliosis. In the same way unfavorable home conditions, in the way of bad food, overwork, unsanitary surroundings depreciate muscular strength and favor bad attitudes.

Lovett believes that if the cases of scoliosis are divided into two classes—first, the cases of postural or false scoliosis, with cases of mild structural scoliosis in this class, it is fair to assume that unfavorable conditions in school are a factor of much importance in causation. But if one takes the second class in moderate and severe forms of real scoliosis, our best knowledge makes it seem unlikely that of themselves unfavorable school conditions can cause these grades.

Sever, quoting the United States census report of 1910, says that the frequency of scoliosis in school-children increases with the age of the child and the class, but that constancy of progression is not always found, and that their susceptibility to compound, or structural curves, increases also with their age (Figs. 1 and 2). There is a rapid increase between the ages of eight and thirteen years, especially the ages of eight and eleven—a period, usually, of rapid growth, which period also corresponds to the highest percentage of school attendance for persons of school age.

"Kirsch, of Magdeberg, examined 1,000 school-children for evidences of lateral curvature; 500 were examined at the time of entrance to school, and also at the end of their school life. At the beginning, 21.9 per cent. of the girls had scoliosis; at the end 41.1 per cent. of the girls had scoliosis. Of the boys, 19 per cent. at the beginning had scoliosis, and 21.4 per cent. showed evidences at the end. 7.4 per cent. of the girls had fixed, or structural scoliosis; and 7.2 per cent. of the boys showed a similar condition. The influence of school life raises the proportion of scoliosis from 20 to 30 per cent., whereas in the girls the proportion

of rise in the cases of structural, or fixed scoliosis was 5.5 per cent.; there was no increase in the boys.

"Gronberg has examined 8,053 school-children. Of these, 48.1 per cent. showed evidences of bad attitudes and deformities.

"Dukes examined 1,000 boys and reports 445 cases of lateral curvature, giving a percentage of 44.5 per cent.

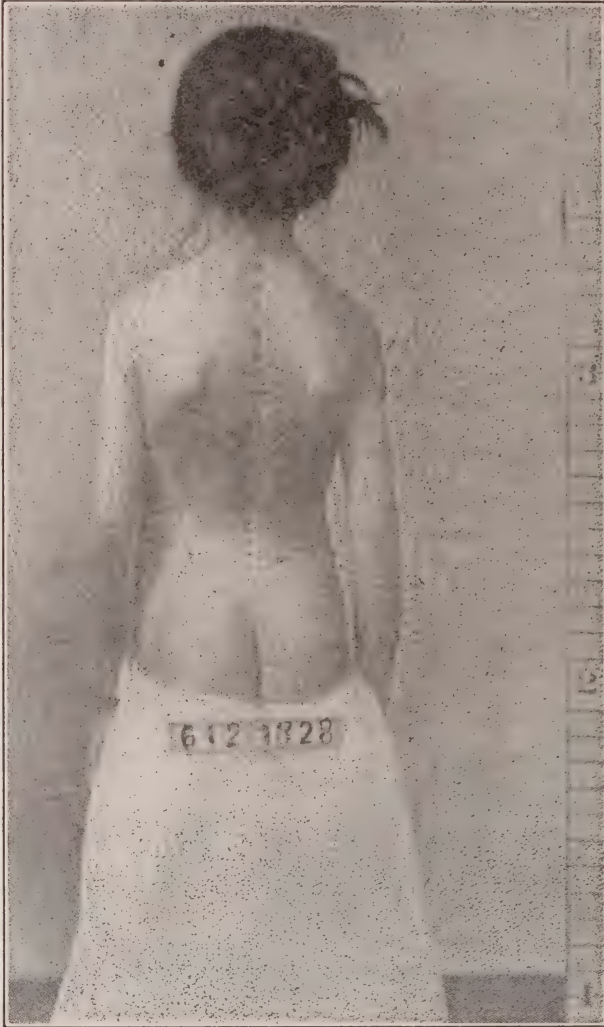


Fig. 1. Showing typical case of left total scoliosis; physiological curve.

"Scholder examined 2,314 school-children and found 571, or 24.67 per cent. scoliotic; frequency equally divided between the two sexes. Of these, a great majority had a left curve, and Scholder believes this tendency to a left-sided lateral curvature is alone a sufficient argument that school is a determining factor in the causation of scoliosis, as this attitude corresponds to that taken by the writing child. He compares his figures with those of other observers in other places as follows:—

	School Children	Scoliosis	Percentage
"Guillamne, Neuchatel.	731	218	29
Krug, Dresden.	1418	357	25
Hagmann, Moscow.	1664 (girls) ...		29
Kallbach, St. Petersburg.	2333 (girls) ...		26
Scholder, Lausanne.	2314	571	23.67
Average, about 27 per cent.			

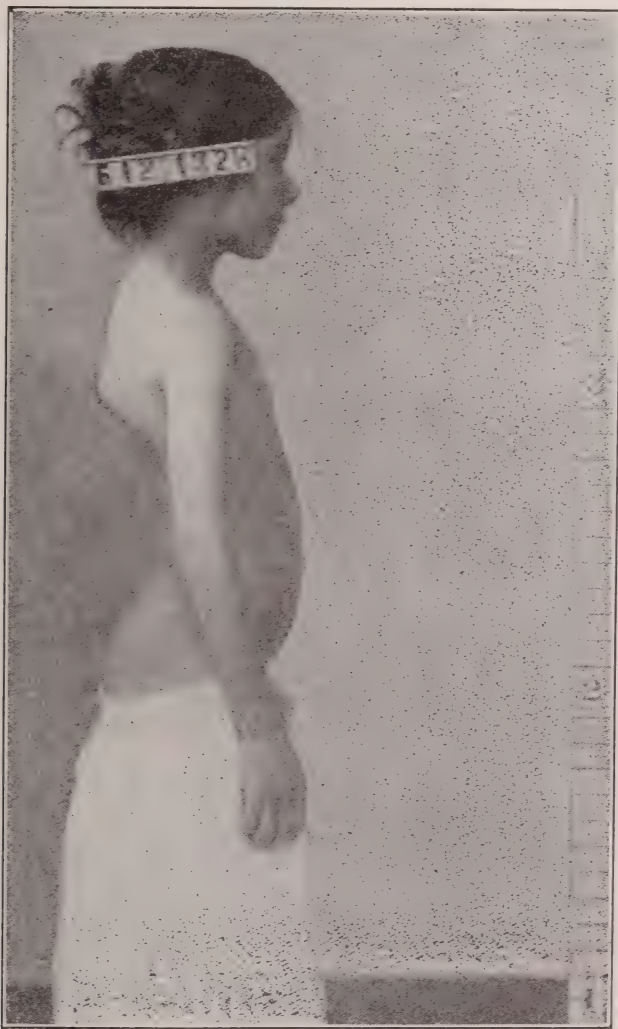


Fig. 2. Showing anteroposterior position of same child as that shown in Fig. 1. Note round hollow back, with forward shoulders.

"Silfverskjöld, of Stockholm, has examined 3,234 girls and found scoliosis in 416, or 12.8 per cent. The largest proportion of these cases occurred from fifteen to sixteen years of age.

"McKenzie, of New York, examined 122 school-children and found 32 with scoliosis. He found in 446 athletic college students 19 per cent.

with scoliosis. In another series of 200 college students there was well-marked spinal curve in 8 per cent. and slight curve in an additional 16 per cent. In a girls' high school, out of 160 examinations, scoliosis was present in 31, or 19 per cent. The average of all observers shows about 27 per cent. of occurrence, with the period of greatest frequency between the ages of seven and fourteen years."

From the above review of the literature and statistics, Sever is inclined to the view that lateral curvature is a real problem to be met in the school-child; and that this can be done by means of proper school furniture he has endeavored to show in a most careful study of school seating throughout the United States, believing that this study conclusively proves the real and practical need and value of proper school desks and school chairs for school-children. He also points out the necessity of establishing departments of physical education and school hygiene, combined properly with the development of athletics in the schools. He quotes the work done in Oakland by the Department of Physical Culture, under the charge of Pfund, the aim of this department being threefold:—

"I. Improvement of the functional activity of the body, especially the functions of the lungs and heart.

"II. *Breathing Exercises*.—Prevention and correction of tendencies to abnormal development, especially those resulting from 'sedentary attitude during school life.'

"III. *Orthopedic Exercises*.—Development of the body into a harmonious whole, under perfect control of the will. It is not to produce great bulk of muscles (professional athletes), but to cause that already present to respond readily to volition.

"*Standard Chest Expansion*.—The standard chest expansion of all grammar grades combined was 2.87 in. in February, 1908, and reached 4.48 in. in December, 1911, which is an increase of 56 per cent. in a four years' period.

"*Aims of Deep Breathing Exercises*.—The system of deep breathing exercises prescribed by this department has the following physiological aims:—

"1. Strengthening of the lung muscles proper, the diaphragm and the intercostal muscles.

"2. Strengthening of the muscles that are helping in the breathing process. (Muscles leading down from the neck, shoulders, arms, chest, loins.)

"3. Increasing the elasticity of the lungs and the chest.

"4. Equal development of all parts of the lungs.

"5. Enlarging of the chest cavity and permanent increase of the breathing capacity of the lungs.

"6. Deepening the ordinary breathing.

"7. Increasing of the circulation and purification of the blood.

"*Work Toward Erect Postures*.—Children, on account of hereditary tendencies, general weakness, rapid growth, malnutrition, poverty of blood, scrofula, or other protracted illness, are particularly inclined to spinal troubles. The most common trouble among children is the 'kyphotic back,' or posterior curvature of the spine, with the corresponding depression of the chest wall.

"So much has this condition been, and is still being, neglected in most of the schools of this country, that we have come to believe that a stoop back is physiologically normal! See about town and convince yourself of the truth of this fact.

"The first conditions mentioned in connection with bending over the desks while writing, drawing, reading, etc., will undoubtedly produce a posterior curvature of the spine (kyphosis); and if the body is allowed to twist in the seat at the same time, a lateral curvature of the spine (scoliosis) will surely result in time. In order to ascertain and to prove such faulty postures in the desks while performing written work, the physical director has taken a number of photographs, the children being entirely unaware of it. These pictures will be used for lectures for the teachers and pupils when ready.

"Examination of Postures.—The nature of the postures on the photographs thus obtained showed the necessity of some action. The physical director thereupon made an examination on postures of all the children (14,000) in the school department. The records of each child individually, as well as of the class collectively, are kept by the teacher, who is instructed especially to watch and to help the stooping ones. In order



Fig. 3.

Fig. 3. A very bad type of chair.



Fig. 4.

Fig. 4. Chandler adjustable desk with the Boston chair.

to increase the 'sense of being' and of keeping straight, several outlines of back and chest of the physiologically best looking pupils were drawn on the blackboard, and afterward the outlines of the most stooped, as a contrast. These comparative outlines seemed to have a very strong impression upon the children's minds."

Sever's study of school furniture as used in the United States is best given in his own words: "The question of school furniture has been before the public for some seventy years, having originated with Barnard in 1842, and about 150 models of desks and chairs have been advocated. At present a great number of American school-children are sitting in chairs which give no support or inadequate support to the back in any attitude they may assume, and at desks which are not adjusted either to the proper height or at a proper distance (plus or minus) in relation to the child's needs. To be sure, many cities are using adjustable furniture; and in one state, Indiana, 20 per cent. of all new installation is

required by law to be adjustable. It is a fact, however, that in many schools, benches with and without backs, kitchen chairs, and single and double settee seats are found in common use, much to the detriment of the pupil's proper physical development.

"Adjustable furniture is rarely used altogether in all schools, many departments being content (where any is used) to limit their equipment of this type to a percentage of twenty-five or even fifteen. Many school-rooms have but one row of eight desks and chairs of the adjustable type (Figs. 3 and 4).

"It is also true that no matter how much adjustable furniture is installed, it is no better than the old chairs or benches unless it is adjusted. That is, each pupil should be fitted to the seat and desk in a proper relation.

"The reason for adjustable furniture, provided it is adjusted, may be seen from the following statements: Conditions have been noted where



Fig. 5.

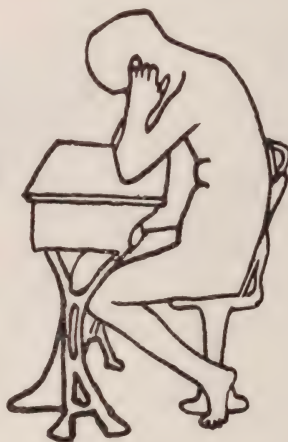


Fig. 6.

Fig. 5. Showing unnecessary support above the hollow of the back; contributes to slouching.

Fig. 6. Showing a chair and desk too small for a large child, which condition allows nothing but a bad posture.

children differing seven years in age and twenty-two inches in height have been found sitting in similar seats and at similarly arranged desks. These conditions, I venture to say, could be duplicated in many school houses in this country where no opportunity exists to adapt the individual pupil's size to the desk and chair in their proper relations: either the desk is too high and the chair too low, or vice versa. The desk may also be too far away from the seat—a too great plus distance; or too near—a too great minus distance; causing undue stretching of the back muscles in the first instance, and a cramped position in the second.

"Thomas Wood states that all seats and desks should be adjustable and adjusted. He gives figures on 25,000 boys and girls, showing that the amount of variation in height at the same ages has been 11.35 inches.

"*Proper Relation of Seat and Desk to Pupil.*—School desks should leave room enough for the knees, and should be low enough so that the elbow and forearm may rest comfortably on it without bending the back. The slope of the desk theoretically should be about 30° ; but as that is

too steep an angle to allow books and papers to rest on it without sliding off, a compromise angle of from 12° to 15° has been selected. The seat should be no wider than the width of the hip, for wider seats predispose to slouchy attitudes. It should be about two-thirds the length of the thigh. It may or may not slope very slightly backward, but this is of no great importance. Any great slope is distinctly bad. The height from the floor should be such as to allow the feet to rest equally and comfortably on the floor. A seat of too great breadth, as well as one of too great depth, compels bad postures. The seat should have a back which supports the lumbar spine when sitting, at work, as well as at rest.

"For standard use, the front edge of the seat should be about one inch behind the front edge of the desk—a so-called plus distance of one inch. The back of the chair should be either straight up and down or sloping very slightly backward, and should support the spine in the lumbar region. The lower edge of the support should come about one inch above the hip bones. Any support above the hollow of the back is superfluous, and often of distinct disadvantage in that it offers a support for the common slouching attitudes seen in children when sitting on the forward

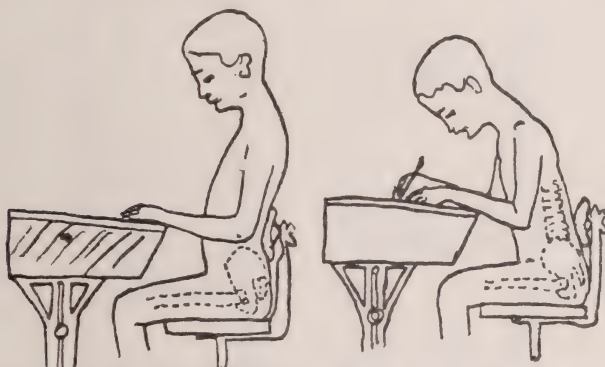


Fig. 7. Boston School House Commission desk and chair, devised by Dr. F. J. Cotton.

edge of the seat, the spine bowing backward between the lower end and the top of the shoulder blades (Figs. 5 and 6).

"The back should give plenty of clear room at its lower portion for the buttocks and clothes; otherwise, the child will be cramped and pushed forward in the chair.

"The essential features in adjustable school furniture are as follows:—

- "1. Adjustment for height, vertically, of chairs.
- "2. Adjustment for height, vertically, of desks.
- "3. A back rest of proper inclination, with adequate support for the lower back.

"4. A proper depth of seat.

"5. A proper slope of seat.

"6. An adjustment of desk or chair for plus or minus distances.

"Quoting from Dr. F. J. Cotton's report to the Boston Board of School House Commissioners, he states the following salient points: 'We have long known how undesirable long-continued flexion of the back is in regard to producing scoliosis, as well as kyphosis. Certainly one of the most important things to avoid in seating children is the tendency to flexed

and twisted positions. For a considerable part of their time at least, we want them near the balanced sitting position. . . . Now if we are to work against flexed positions, we must maintain the lumbar curve. This means support to the lower lumbar spine. The straight chair back cannot give this; and considering the varying anatomical curves, and, even more, the variation in the size of the buttocks and the bulk of the clothes, no fixed long curve can be devised to give such support in all, or even most individuals. We must have direct support applied where we most need it. With the lumbar curve supported, the chair back need go but little higher to give full comfort in the proper sitting position; and below this lumbar region, no support can be of any use. The top of the back need come no higher than the top of the desk edge.'

"Dr. Cotton devised an excellent adjustable seat and back (Fig. 7)



Fig. 8. Miss Emma G. Sebring's school chair with adjustable lumbosacral support, favoring correct posture.

which is extensively used; but I have been told that on account of the slight increased expense in its manufacture, chair manufacturers are disinclined to bid on it or school departments to call for its installation.

"In order to learn what types of school furniture were being used in cities of the United States, I addressed an inquiry to the school departments of all cities over 25,000 inhabitants, as shown by the United States Census of 1910, asking for information as to their school furniture and the total enrollment of pupils. Some gave me the information I wanted; some sent me much information I did not want and none that I did; and from many I had no replies. In all, I had replies from about 38 per cent. of the 230 odd school departments I addressed.

"The following points of interest were discovered:—

"1. The almost total uniformity of the cities toward the installation of adjustable furniture.

"2. The use of the single desk and chair, and the abolition of the old double desks with settees and benches.

"3. The large number of cities and schools content with but a small percentage of their total equipment adjustable.

"4. The uniformity of the two types of adjustable furniture—namely, (a) the separate chair and desk; (b) the automatic with settee seat.

"5. The inadequacy of the first type No. 4 (a) of chair back, and the absolutely faulty design of No. 4 (b), which cannot but cause bad attitudes and which must be anything but comfortable. The seats slope too deeply backward, and the backs very considerably beside giving support in the wrong places."

Sever's general conclusions are as follow:—

1. All chairs and desks should be adjustable to height.
2. Chairs and desks adjustable in other directions are not necessary.
3. A slight plus distance of about one inch is a good standard to go by in the relation of the desk to the chair seat.
4. The desk top should slope 12° to 15° , and should be wide enough to allow the whole arm to rest on it in writing.
5. The chair seat should be flat with rounded corners and edges; or slightly concave to fit the buttocks.
6. The chair back should be wide with but two outside uprights; no higher than the lower part of the shoulder blades, with an adjustable cross-bar, convex forward and concave from side to side, to fit the lumbar curve.
7. From a sanitary point of view, single standard desks and chairs are good, provided the other qualifications are not lacking.
8. Benches, chairs of the kitchen-backed type, movable chairs and settee chairs are distinctly bad.
9. Physical education departments are essential in connection with all school departments.
10. Pupils should have frequent rest and exercise periods.

DIAGNOSTIC AND THERAPEUTIC NOTES.

PALPATION OF THE DIGESTIVE TRACT.—Hausmann (*Berl. klin. Wochenschr.*, No. 32, 1913). In an interesting communication before the Berlin Medical Society, Hausmann described his method of palpating the digestive tract. The procedure is simple in theory but requires some training in practice. The patient lies on his back, as relaxed as possible. He breathes deeply and regularly. The palpator must observe two rules. He must palpate (and that gently) only during expiration and the respiratory pause, never during inspiration, and he must allow his fingers to slip transversely across the organ that is to be felt. The small intestines, with the exception of the cecal portion of the ilium, cannot be palpated. The latter can nearly always be felt where it crosses the psoas muscle, especially if the latter be contracted by flexing the right thigh upon the body and then extending the leg. The thick cord thus felt is often mistaken for the appendix; the latter, unless thickened, can rarely be felt and then can be identified only if it, as well as the ilium, is made out. The sigmoid and the cecum can usually be palpated, the transverse colon less frequently, and the greater curvature and pyloric portion of the stomach in less than half the cases. For other interesting points, such as the impossibility of diagnosing spastic constipation by means of palpation and the caution with which localized tenderness should be interpreted, the reader must be referred to the original.

MEAT BREAKFAST AS TEST MEAL.—Skray (*Wien. med. Wochenschr.*, No. 30, 1913). It often happens that stomachs, which react towards the usual test breakfast with subacidity or anacidity, produce a considerable amount of hydrochloric acid after a more generous meal. Skray has found that this phenomenon can best be studied by analyzing the stomach contents first after a toast and water breakfast, and then after the same meal plus 30 grm. finely scraped raw ham. In almost every case of subacidity or anacidity, the stomach contents contained more acid after the second meal than after the first. A striking characteristic of the anacidity of gastric cancer was the absence of any such difference between the two stomach contents.

HEMOLYTIC SPLENOMEGALY.—Banti (*Semaine méd.*, No. 27, 1913). The study of a remarkable case of Banti's disease (anemia, icterus, splenic tumor, recovery after splenectomy) led Banti to the investigation of the rôle of the spleen in hemolysis, in a large series of experiments on dogs and rabbits. Different hemolytic substances were injected into the bloodstream and the behavior of the various organs studied. He found that there are a large number of substances that have no direct hemolytic

action on the blood, but are able to stimulate several of the organs to hemolysis. Of these organs, the one most readily stimulated in this way is the spleen; a feeble activity is shown by the liver, lymph-glands and bone-marrow. A spleen, that is actively producing hemolysis, always enlarges considerably. If the toxic substance suffices to produce spleen-hemolysis, but does not perceptibly stimulate in this manner the other organs, then an extirpation of the spleen results in a cessation of the hemolysis and in recovery of the animal. Banti applies these experimental results to human pathology. The good results obtained in Banti's disease by splenectomy are due to the removal of the organ producing the hemolysis. The unknown toxic agent remains, but, in the absence of the spleen, is unable to unfold its activity. He suggests that the operation be tried in other severe anemias due to hemolysis; for instance, in pernicious anemia.

TUBERCULOSIS DIAGNOSIS BY MEANS OF ANIMAL EXPERIMENT.—Conradi (*Muench. med. Wochenschr.*, No. 29, 1913). Conradi advocates the following method. White or nearly white guinea-pigs are inoculated with the suspected material, subcutaneously in one groin. On the ninth day, the skin of the abdomen is shaved; thereupon, a cutaneous test (v. Pirquet's method) is done daily, with undiluted tuberculin and a stout vaccination scalpel. As soon as a positive reaction is observed (within twenty-four hours, if at all), the animal is killed and examined for tubercles. The latter will always be found, especially in the inguinal glands, liver, spleen and bronchial glands.

TREATMENT OF BURNS.—Wulff (*Muench. med. Wochenschr.*, No. 30, 1913). The writer praises the Rovsing's dressing for extensive burns. The injured area, and the neighboring skin, are first thoroughly cleansed; an anesthetic may be required. The entire wound is then covered with sterile rubber tissue, containing many small slits; over this, a thick sheet of 1 per cent. silver nitrate gauze, then cotton and a bandage. The results are nearly uniformly good.

THE HERMANN-PERUTZ REACTION COMPARED WITH THAT OF WASSERMANN.—Braeutigam (*Berl. klin. Wochenschr.*, No. 33, 1913). The reaction consists in the addition of a sodium glycocholate cholesterin suspension to the inactivated serum; a precipitate has the same significance as a positive Wassermann. The writer's results indicate that the method has value.

THE LACHRYMAL GLAND DURING NARCOSIS.—Rutherford (*British Med. Journ.*, June 21st, 1913). The secretion of tears may be conveniently used to estimate the depth of a narcosis. At the beginning of the narcosis, the flow of tears is increased only if the eyes are irritated by the anesthetic; during the period of excitation, the increased flow is marked, the tears overflowing the inner canthus. As the anesthesia grows deeper the

flow ceases and the inner angles of the lids become dry. A dilatation of the pupils may indicate either an overdosage of the anesthetic or an impending return of consciousness. In the former case, the eyes remain dry; in the latter, an abundant secretion of tears may be observed. The simultaneous observation of pupils and tears may thus be a useful guide to the anesthetist.

DIAGNOSIS OF PNEUMOTHORAX.—Mandru (*Semaine méd.*, No. 24, 1913). In cases of suspected pneumothorax, an empty syringe is armed with a rather long needle, and the latter thrust through the chest wall. The piston of the syringe is then slowly pulled out. If the eye of the needle is in the chest wall or in the lung tissue, the piston, on being released, snaps back into place. In the presence of a pneumothorax, however, the syringe readily fills with air. The writer has used the method in a number of cases and considers it the simplest and most certain test.

BLOOD CHANGES IN MUMPS.—Feiling (*Lancet*, July 12th, 1913). The blood in mumps shows two constant and characteristic changes, an absolute leucocytosis and a relative lymphocytosis. The latter sets in early in the infection and persists two weeks. No other affection of the parotid gland shows these changes.

PELLAGRA.—Mott, Sambon, Box, Hammond (*British Med. Journ.*, July 5th, 1912). These English cases of pellagra are of importance, since none of the patients had ever eaten maize. All of them had, however, suffered frequently from insect bites and some of them always showed exacerbations in spring and summer with remissions in winter. Sambon holds that the evidence clearly points to a malaria-like infection, the carrier of which is a sand-flea (*simulium*) whose larvæ he found in pellagra localities. In these localities, small children and even nursing infants were infected.

RECOVERY IN TUBERCULOUS MENINGITIS.—v. Reichmann and Rauch (*Muench. med. Wochenschr.*, No. 26, 1913). Daily lumbar puncture, with withdrawal of moderate amounts of fluid until the pressure fell to 130 mm. water, resulted in recovery in 2 cases. In both cases tubercle bacilli were found in the spinal fluid.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

The great Congress has long since broken up, and our guests are dispersed to the four quarters of the earth, whence they came. The thunder and the shoutings have died; the captains and the kings departed; and London, which, for the space of a week or two was filled with charming strangers displaying the bronze medal and blue ribbon of the Congress, is now as dull and as lifeless as usual at this season of the year:

Speaking as an Englishman, I will only say that I hope and believe the Congress was a great success, and that our visitors both enjoyed and profited by their stay in London. We, for our part, certainly took advantage to the full of every opportunity for realizing the personality of this or that outstanding figure in American, French, German, or other medical world; and, if the actual contributions to the deliberations of the Congress made by our own teachers and masters were not too numerous, it was perhaps because, as hosts, our duty was not to talk, but to listen and to entertain.

Long before these lines are in print, you will have read all that many writers have found to say about the whole affair, and will have studied many of the original and striking papers that were presented.

While there is little danger that the notable addresses delivered before the Congress escape attention, the important proceedings of at least one other body that met recently in London may perhaps be somewhat overlooked. I refer to the Conference of the National Association for the Prevention of Consumption and Other Forms of Tuberculosis, held during the days that immediately preceded the great doings at the Albert Hall.

The proceedings were formally opened by the Premier, Mr. Asquith, in a few of those massive yet lucid sentences whereof he is a master. Mr. Asquith, *inter alia*, and possibly not without some subtilty, alluded to the fact that there has been during the last thirty years, coincidently with certain improvements in our national arrangements for the conduct of life, a progressive drop in the general death-rate from phthisis; how there is always a tendency, amongst the English at any rate, never to become exercised in mind concerning any evil until that evil has been partially subdued. Thus, just as what is called the public conscience did not become really awakened in respect of excessive indulgence in alcohol, until the consumption of that commodity had lessened greatly, so the public are only anxious about tubercle now that the mortality has vastly diminished. Now, too, that various circumstances have considerably reduced the incidence of syphilis in this country, an agitation is being loudly promoted for its control by some form of administrative action. To fur-

ther this end, the appointment of a Royal Commission has been proposed. Yet, with all this almost feverish activity, it is worth noting that there is a distinct undercurrent of hesitation, if not of actual reluctance to take part in these movements to clear up in a hurry the difficulties that have persisted in the world for centuries. This hesitation seems born of a subconscious realization that, as the old Manchester school of economists believed, merely to deal with secondary results, without altering fundamentals, simply shifts the incidence of evil from one spot to another, without in any way lessening it. This is a point seldom enunciated in public nowadays; yet it was well expressed by Dr. Drysdale, at the recent meeting of the British Medical Association at Brighton, when he showed, lucidly and convincingly, how the establishment of the wonderful Hungarian institutions for the care of infants and children had been followed throughout the country, not by an improvement in the death-rate, but by an actual increase; attributable to the relaxation of maternal care that must inevitably follow the assumption by the State of responsibility for the performance of maternal duties. And so with tuberculosis. For years past our newspapers have been filled with scareheads about the 'Great White Plague'—now a little out of fashion, since alarmist articles concerning the 'White Slave Traffic' and the 'Black Plague' or 'Hidden Evil' have been found better 'copy,' and there has been much journalistic canvassing of the relative merits of sanatoria and tuberculin methods of treatment of tuberculosis.

Some old-fashioned people think that, if there had been less writing and debating *coram publico*, the profession would have come ere now to some sane and well-defined opinion on this issue. But there has been so much overstatement first on one side and then on the other that judgment has become difficult—a truth amply demonstrated by the proceedings of the Conference to which I have just alluded.

Following the speech of Mr. Asquith then, there was delivered, by Dr. Hector Mackenzie, a balanced survey of the question of tuberculin treatment, which will be found in the *Lancet* of August 23rd.

Dr. Mackenzie, who first recapitulated some of Koch's original observations—a little unfamiliar perhaps to some of the young lions of to-day—and then discussed the applications of tuberculin in modern practice, went on to say that, in his opinion, it is only rarely that there is any necessity to use tuberculin for diagnostic purposes.

The uses of tuberculin as a therapeutic agent were examined by him at greater length, only for the conclusion to be reached that tuberculin is still on its trial; that the results are not convincing, and that there is too much theorizing and talk.

Sir James K. Fowler, whose mature judgment carries the greatest weight in all clinical matters of import, subsequently delivered a powerful address, which made a considerable impression on his hearers. He laid down certain propositions which may usefully be reproduced. In the first place, said Sir James, the use in any form of tuberculin in the treatment of pulmonary tuberculosis is not free from danger, and is absolutely inadmissible in any case wherein there is fever. Fever, the speaker proceeded to say, he has always taught to be the guide to the activity of the disease; therefore, the rôle of any remedial agent which can only be employed in afebrile cases is very limited. General reactions should be avoided. If one continues, the treatment should at once cease; for, to continue injections with increasing doses, in spite of such reactions, is unjustifiable and dangerous to the life of the patient. Focal reactions

are also dangerous, as they cannot be controlled. Finally, the treatment likely to be attended by the best results should follow the lines of rest and exercise originated by Walther at Nordrach, and further developed by Paterson at Frimley. Such, in respect of the uses of tuberculin, are the considered opinions of a physician of almost unrivalled clinical experience, and on whose judgment, as I have said, the greatest reliance is always placed.

Yet Dr. White, of Pittsburg, whose contribution to the transactions of the Conference is, with Sir James Fowler's, printed in the *Lancet* of August 9th (himself, as he averred, one whose own life has been marked by tuberculosis), declared that he believes fully in tuberculin as an aid to treatment of tuberculosis; nay, more, that it is the only specific treatment we possess, and the most valuable aid to hygienic measures in our hands to-day. But—and here lies a suggestion of great significance, I think—"the last dregs of the disease are always very hard to remove, and there is probably some other factor which we have not yet learned, which must be added to tuberculin before we have a real specific for this disease."

Sahli, whose admirable work on tuberculin treatment was only issued last year to English-reading students for the first time, insisted on the essential identity of the various tuberculins, and on the advantages of using such preparations and dilutions as Béranek's. He condemned the diagnostic use of tuberculin, except by von Pirquet's method, absolutely; and asserted that tuberculin treatment is free from danger only if the more obvious clinical reactions are avoided. Sahli believes that the optimum dose, which should not be overstepped, is a much smaller dose than that which marks the furthest limit of tolerance; and he does not think that the large doses recently recommended for the purpose of reducing temperature have any curative action. He is willing to admit that tuberculin treatment has not the character of a true immunization, though he thinks it produces immunizatory effects on the organism. Finally, "well-diluted tuberculin treatment constitutes a real and great therapeutic progress."

If I may venture to express any opinion of my own, I may perhaps say that as one who was a resident officer at the Brompton Hospital for Consumption nearly twenty years ago, I have been conscious for some time of hesitation in admitting the therapeutic benefits of tuberculin in phthisis; yet that, of late, with increasing experience at least, I have become impelled, more or less insensibly, gradually to recognize that it has a very definite sphere of usefulness, especially when dealing with those for whom, from one reason or another, sanatorium or climatic treatment is an impossibility; and that, not infrequently, amongst the most adverse circumstances and in the most unpromising cases it appears to achieve very striking results. But one feels sure of this, that if tuberculin is to be 'given a chance' the most scrupulous care should be exercised to give the patient the advantage of every subsidiary or concomitant method available.

We hear a good deal from time to time of so many patients having been treated with cod-liver oil and creosote, and so many with tuberculin; and of the serial results in the two groups of cases showing little or no difference. It would seem more logical to compare the results arrived at by treating one group of persons with tuberculin as well as cod-liver oil, creosote and other medicines, with those obtained by treating other groups with tuberculin alone, and with medicines alone. It is hardly

creditable that in the medical profession there should be so little evidence of approach to real community of opinion on so important a matter as this question of the utility of tuberculin. It is, indeed, not far from becoming a moot point whether, when all is said and done, but for increased promptitude in diagnosis, while we are congressing and conferencing, many individual patients are not indeed faring worse than would have been the case twenty years ago.

In this matter of diagnosis—and no apology is needed if it be dwelt upon—some useful lessons may be learned from a perusal of two lectures that have lately appeared—one by Dr. Mitchell Bruce, so long and so notably connected with the Brompton Hospital for Consumption, and the other, by Dr. Clive Riviere—a physician of the younger school. The first lecture was printed in the *Lancet* of July 19th; the latter, in the *British Medical Journal* of August 30th, 1913.

Dr. Mitchell Bruce, dealing with cases in which tuberculosis exists within the thorax, yet without signs of apical consolidation, and in which neither cough nor expectoration is present, laid stress on the fact that so many dry and 'latent' pleurisies are followed by tuberculosis of overt character and that pleurisy with effusion is almost always, in young persons, evidence of intrapulmonary tuberculosis already existent. Cases of what Dr. Bruce called '*haemoptysis sine signis*' were discussed at length and the fact was forcibly driven home that such cases do occur wherein the most scrupulous examinations fail to reveal signs, and yet in which sooner or later there is an active development of pulmonary tuberculosis of the ordinary kind. Other cases referred to by Dr. Bruce as giving rise to difficulties in diagnosis were those masked by bronchial catarrh and sometimes associated with emphysema. The lecturer declared that he still appreciates the importance of the patient's family history in attempting diagnosis, and illustrated his point by reference to some cases wherein conviction was only reached when knowledge of the extremely bad family histories was applied to the explication of illnesses wherein the only complaint was that of languor. A very common error is, Dr. Bruce went on to say, to confound early febrile tuberculosis with typhoid fever; though perhaps to mistake early tuberculosis for influenza, is, as Dr. Jex-Blake has recently pointed out, a still more frequent occurrence. A very interesting and practical discussion was brought to a close by some consideration of the question of sanatorium versus non-sanatorium treatment. Dr. Bruce declines to pin himself without reserve to one or the other method. He finds in every case of pulmonary tuberculosis indications for and against sanatorium treatment, sometimes the one, and sometimes the other set of *indicia* prevails in his mind. In cases which are not sent away, the method of continuous inhalation recently advocated with great force by Dr. David Lees, in the little book he has just published, is, Dr. Bruce believes, "peculiarly suitable and successful." But of tuberculin, Dr. Bruce said just this, that "it may be indicated clearly" in some of the cases that are not sent into sanatoria.

Dr. Riviere in his paper dealt with many points untouched by Dr. Bruce. He discussed the methods of topographical percussion associated with the names of Kronig and Goldscheider, and found them to be useful, but not more than useful. The same may be said of tidal percussion, he thinks; but radiography is a method of observation that has not merely been of help to us in diagnosis, but that has greatly altered our views of tuberculous disease inasmuch as it has helped us to realize not only that old hilum disease is almost invariably present in case of phthisis, but that

there is often a spread of infection from the hilum along the peribronchial tissues. An excellent point—not, I think, always referred to—is that tuberculosis, when it spreads to the second lung, affects the deeper portions first, so that, whatever may be said as to the relative advantages of radiography and physical examination in respect of the early detection of the first site of infection, there can be no doubt that a skiagram will, earlier than auscultation and percussion, compel attention to the lung originally regarded as sound. So far as the diagnostic use of tuberculin is concerned, Dr. Riviere agrees with most people that it is indubitably a method of discerning tuberculous infection, but that it is only of limited value in respect of the diagnosis of clinical disease. It should not, however, be applied subcutaneously except in those cases whereof the diagnosis cannot be positively made by those equipped with special skill. If this rule were to be followed, the subcutaneous use of tuberculin for diagnostic purposes would be restricted; and all attendant risks would perhaps disappear. The quantitative von Pirquet test, Dr. Riviere thinks, is of some value—very high sensitiveness being some evidence of disease, and very low sensitiveness some evidence of its absence. He makes five scarifications instead of the four usually advised, in order to avoid certain fallacies.

In respect of laboratory methods, the introduction of Uhlenhuth's anti-formin method was regarded as the most notable achievement of late years, but considerable value is to be attached to Much's discoveries. Dr. Riviere also recognizes the albumin method and the importance, sometimes, of a Wolff-Eisner cytological count. The examination of the blood for tubercle bacilli may, in the near future, be a method of practical utility, but complement deviation reactions give positive results in old and healed cases as well as in those where there is active disease. More may be said for the application of the opsonic method, if conducted by an observer of known skill, and if a series of indices are taken under different conditions.

Dr. Riviere concluded his examination of modern methods by advising his hearers to devote all their attention to ordinary physical signs (especially to light percussion); to the temperature chart; and to the evidence of symptoms. Well, Sir William Osler, in the last edition of his textbook, says that one lesson of the last few years is that we should, in the diagnosis of pulmonary phthisis, pay more attention to symptoms than to physical signs. It is interesting to ponder these mature reflections of experienced physicians, for, some of us who fifteen years or so ago incurred sad ridicule for saying that phthisis could really sometimes be diagnosed, in the absence of physical signs, by attention to symptoms alone, now find that younger 'tuberculosis experts' who are handier with a syringe than with a stethoscope, rely, almost exclusively for purposes of diagnosis on laboratory methods whereof the application is only of relative value.

Many of these young and enthusiastic 'experts' too, who are now zealously fulfilling the duties of the many official posts that have been so freely created during the last few years, are more at home with the dilutions and rivalries of the different preparations of tuberculin than with the prescription of a linctus that may give the patient a night's rest. Perhaps it is as well then that a conservative note should be sounded—and listened to—now and again!

September 10th.

PARIS LETTER.

PROTECTION AGAINST X-RAYS.

By AUGUSTE A. HOUSQUAINS, M. D.

In spite of the progress which has been achieved by radiotherapy, and the scientific basis upon which it rests, we are aware, nevertheless, of the serious accidents which happen unfortunately only too often to physicians and their assistants as well as to chemists who handle the Crookes tube. It is easy to understand the practical interest which would inhere in studies that might furnish a means of protection against the deleterious action of a method that has everything in its favor, whether considered as an aid in diagnosis or as an agent in the treatment of certain diseases.

It would be well here to recall the genesis of our present-day ideas in regard to the mode of action of invisible rays, the discovery of which was made by Roentgen in 1895.

According to M. Bécère, the Roentgen ray, when it comes in contact with a living organism, divides into two unequal fractions: One penetrates the body, while the other is arrested at the point of entrance. The first, partly collected on a sensitive surface (a fluorescent screen or a photographic plate), is the means of photographing a picture of the organs which have been penetrated; the second, which alone is important in radiotherapy, acts on the living cells which by absorbing it have their chemical composition modified, their nutrition disturbed, their multiplication hindered, and even degeneration and death provoked. Mention should be made here that after the discovery of the Roentgen rays, no attention was at first given to the existence of the fraction of the rays which, absorbed by the living tissues, was capable of modifying them as regards their structure; but it was soon noted, in various patients, that with them an exposure to a Roentgen ampoule lasting too long was followed, after some days, by reactionary phenomena at the surface of the skin. This reaction to the *x*-ray manifested itself in divers degrees, from the falling of hair to mortification *en masse* of the skin and the subcutaneous tissue. Among the extreme cases, rubefaction, vesication, and more or less deep ulceration of the skin were observed.

Naturally, comparisons were made between these lesions and those which are produced by burns. Observations of these accidents led Schiff and Freund to utilize the action of the *x*-ray as a means of depilation in hypertrichosis. This was the beginning of radiotherapy, and also of all the experimental researches which had for their object the physiological action of the Roentgen ray on animals, plants, and micro-organisms.

Lengthy discussions resulted as to what was the real agent which provoked the lesions thus observed, and whether the electric discharges accompanying the production of the rays or the rays themselves were responsible. Before long it was recognized that all the biological alterations were really due to the Roentgen rays themselves. Experiments on ani-

mals, and especially on pigs, showed that the lesions produced by these rays were the lesions, originally cellular, which attack the nucleus and the protoplasm of the irradiated cells and which resemble above all the phenomena of inflammatory reaction up to degeneration and death of the cells. Hence, Roentgen rays are an agent of cellular destruction. But there are various kinds of cellular elements which are not equally sensitive to the action of the rays. Hence, it would be better to say that these rays are an agent of elective destruction of certain cells, not in the sense that they are capable of choosing among the different cells, since the rays are absorbed to an equal degree by all cells; though it must be added there are some cells that are more sensitive than others to their action.

Experiments on animals have shown that the fatal dose for certain cellular elements of the normal organism is only a minimum fraction of a dose tolerated by other cellular elements. Thus, the epithelial cells of the skin are very sensitive to the destructive action of the rays, yet it is a fact that there are other cells which are still much more sensitive. These are the testicles and ovaries, and the white cells of the hematopoietic organs; and in spite of their relatively deep position the Roentgen rays can destroy them through the integument without any appreciable lesion of the integument itself.

Therapy of recent times has extensively utilized and experimented with the destructive action of the x -rays, not only in the treatment of cutaneous diseases, but also in certain visceral affections—namely, in the majority of the dermatoses, lupus, ganglionic and osteoarticular affections, leukemias, neoplasms, uterine fibromas, hypertrophy of the prostate, Basedow's disease, syringomyelia, tumors of the hypophysis, giantism and acromegalia. These are, at present, the principal morbid conditions which justify radiotherapy. The x -rays can, in determined cases, replace the surgeon's knife; but what should not be overlooked is that the dosage and the mode of application are as yet undecided. On account of this uncertainty there occur the accidents of which mention has been made.

With the object of protecting themselves against the untoward action of the x -ray, operators have given thought to certain means of protection to intercept the penetrating rays. These means consist, generally, of glasses, masks, aprons, and gloves, all of which contain in their make-up the salts of the heavy metals, but up to the present, at least, they are not very practicable. Recently, however, the communication made at a meeting of the Academy of Sciences by Dr. L. G. Droit, on the impermeability to x -rays of textures adequately charged with a solution of lead salts, has been received with a lively interest.

Dr. Droit proposes to further the means of protection already known against 'professional' radiodermatitis. To prevent this he utilizes the remarkable quality which silk possesses to absorb, after repeated applications, quantities, sometimes considerable, of compound metals in solution. By adding lead to these compounds the silk is given a certain impermeability to the noxious rays. Dr. Droit arrived at his conclusions by first consulting two specialists of Lyons, MM. Guicherd and Sisley, well known on account of their knowledge of technique, the one as regards material, the other as to solutions. He soon realized the sort of silk that was most serviceable on account of having been drenched with enormous quantities of phosphotannates of lead in the dye-works. One of the textures (texture D) is particularly heavy and impervious after being sub-

jected to M. Sisley's process—68 per cent. of mineral matter (phosphoric acid 8 per cent., oxide of tin 24, oxide of lead 34, lime, soda, etc. 2).

Dr. Droit, with the aid of six thicknesses of this texture, manufactures a fingerless glove that he utilizes during radioscopic examinations and which, besides its impermeability to the radiations, has the advantage of suppleness. The palmar surface of the hand is protected—a surface that is habitually neglected in these undertakings. Finally, to verify the efficiency of this protective texture, he proceeded to employ a radiography of great intensity; at times this was done with variable thicknesses of texture D, or texture C containing only 50 per cent. of mineral matter. The various radiographies have convinced him of the utility of textures that have been treated with phosphotannate of lead. These, beyond a doubt, arrest the soft rays, those which, as is known, are particularly harmful to the integument. A radiography with a hand enveloped only in two thicknesses of texture D, by means of a tube giving forth very soft rays, showed that these rays had not penetrated this hand-screen. Dr. Droit declares that six thicknesses of texture D constitute a protective screen that suffices against 'professional' radiodermatitis resulting from ordinary radiological operations by the very soft rays; but in case the operator is a beginner who has never had even a slight attack of radiodermatitis, a double or triple thickness of the same texture answers the purpose.

Such, in the rough, is the method extolled by Dr. Droit. His arguments seem convincing. In every case where the exposure has been prolonged, at least this much was attained—the lessening, in a large measure, of the serious inconveniences which the operator experiences when he is frequently exposed to *x*-rays. Certainly, it is vexatious, to put it mildly, that a discovery of the importance and incontestable usefulness of the *x*-ray in medicine can be utilized only at the price of mutilations, suffering, and even the death of those who unceasingly labor on behalf of its therapy.

September 10th.

PRACTICAL MEMORANDA.

By WILLIAM T. COUGHLIN, M. D., of St. Louis.

When operating for chronic intestinal obstruction, the junction of the distended and collapsed portions of the bowel usually marks the site of the obstruction. This does not always hold good when annular cancer of the large bowel is the cause of the obstruction. In this condition the bowel is sometimes found collapsed through muscle spasm for a considerable distance above the site of the lesion.

It seems natural to suppose that, for at least ten days after a woman has given birth to a child, the tissues of the uterus and adnexa are softer and more succulent than they are normally in the non-puerperal state. Also the uterus itself is heavier. It is also true that when a woman lies on her back, the fundus uteri tends to topple backwards into the pouch of Douglas. It is prevented from so falling backward while the woman lies on her back by the round ligaments only. But if after childbirth the uterus is heavier than usual and the round ligaments softer than usual, will these latter not tend to stretch and so allow the fundus to fall backward? One would think so, and the writer believes that the dorsal decubitus in the lying-in period is a most fruitful cause of retroversion of the uterus. And to think of the prevalence of the custom of keeping the patient on her back, and again that it is even *insisted* upon by many physicians!

Vincent's angina is most often unilateral; a tonsil is the seat of a more or less deep ulceration, bleeding with great facility and covered with a false membrane which is of a greyish color, soft and easily detachable. There is profuse salivation and the breath is fetid. There is always sub-maxillary lymphatic involvement, but this is sometimes very slight. Pain is present, but usually not very great, and there is some difficulty in swallowing. The general condition of the patient is good, in contrast to the same in diphtheria. There is usually very slight fever with the onset, but it does not persist. It can be confounded with diphtheria, but cultures and the microscope easily make the diagnosis certain. Syphilis of the tonsil, either chancre or mucous patch, may confuse; with the former the tonsil has the hardness of wood and the lymphatic adenopathy is very marked, while with the mucous patch or the late ulceration there are other lesions, and the history aids in making the diagnosis. The treatment is quite simple and effective, and consists in applying methylene-blue either in powder or in strong solution, two or three times a day.

It is well to mention here the reports of the results of the Friedmann treatment for tuberculosis, since many of the readers will soon be called on to aid in exploiting afflicted patients for the benefit of the syndicate controlling this so-called cure. In a recent issue of the *Journal of the American Medical Association* appeared the following:—

(a) Mannheim reported the results of 18 cases treated in New York and in not one was there improvement which could be attributed to the treatment.

(b) A commission of the best known Canadian physicians, after watching the patients inoculated by Friedmann in the Canadian Hospitals, makes a similar unfavorable report.

(c) Anderson, for the United States government, detailed to watch the progress of cases treated by Friedmann in this country, also gives an unfavorable opinion of the treatment.

(d) The German physicians generally condemn Friedmann and his method.

(e) The Rhode Island State Sanatorium, where 120 patients were given this 'cure,' reports that the patients have shown none of the benefits described by Friedmann, but that 17 per cent. are worse than might have been expected under just ordinary sanatorium treatment.

Scarlet-R (medicinal) in the form of an ointment (8 per cent.) has demonstrated its value in promoting healing in chronic ulcers and slow-healing wounds. To obtain the best results with it, one must not use it continuously, but, after having applied it for three or four days, replace it with some bland non-irritating ointment.

What a change has come over us in the past ten years in regard to the use of ointments! It is not so many years ago that they were branded as unclean and insanitary and as being a hindrance to drainage. At that time we were 'asepsis mad,' if one may so speak. But to-day no one remarks that in most surgical clinics ointments are very frequently used.

The writer has been able to obtain excellent results with an ointment of the red oxide of mercury from $7\frac{1}{2}$ per cent. to 10 per cent. strength, not only in the lesions of luetics, but also where there was no suspicion of syphilis.

As a rule ointments are more grateful to the patient than any other form of dressing, but the precaution must be taken not to dress an irritable ulcer with an irritating ointment.

It is something over four years since Bastedo gave us his sign for chronic appendicitis. It has been investigated by some prominent clinicians in France and Germany and they have confirmed his findings. The sign is: Increased tenderness and pain in the right iliac region on inflation of the colon. It is not always present in chronic appendicitis and it is present after the appendix has been removed. However, we do not think that Bastedo meant the sign to be infallible. Nor do we believe he would base a diagnosis of chronic appendicitis on the presence of this sign alone.

In appendicitis, as in all other conditions, make your diagnosis after carefully weighing the evidence, but be sure you have all the evidence.

Is it not a fact that most of us make our diagnosis and then seek evidence to confirm it?

Thymol is said to be an excellent remedy for tapeworm, and in Indo-China where the affliction is very common it is almost the only remedy in use at present. It is said to be successful in 100 per cent. of the cases.

The evening before, the patient is allowed only milk, and next morning whilst fasting he is given 1 grm. (15 gr.) of thymol in cachet or capsules every hour until three doses are taken. Three-quarters of an hour after the last dose is taken he is given a saline purge. He is ordered not to go to stool until the desire is irresistible and then must sit over a vessel containing hot water. Generally, all is over within two hours after taking the purgative. In the afternoon he is given light diet and next day is allowed his ordinary food.

No oil or alcohol is to be given lest the thymol be suddenly dissolved in the stomach.

Any medical adviser, who treats a child for chronic rheumatism or growing pains in hip or knee (or any other joint) without excluding tuberculosis, is guilty of a mistake that should cause him qualms of conscience later on.

Not every patient with renal colic has a stone in the kidney or uterus—simply phosphaturia can cause severe 'renal colic' and so can several other conditions.

Be chary in your use of hexamethylenamine (urotropin); even small doses can cause a severe hematuria in less than three days.

Do not forget that milk or sugar in the diet often increases the flatulence.

BOOK REVIEWS.

SURGERY OF THE BRAIN AND SPINAL CORD. Based on Personal Experiences. By Prof. Fedor Krause, M. D., Geh. Medizinalrat, Dirigierender Arzt am Augusta Hospital zu Berlin. English Adaptation by Dr. Max Thorek (Rush Medical College University of Chicago), Surgeon-in-Chief American Hospital, Chicago, Ill.; Consultant Cook County Hospital, Chicago, Ill., etc. etc. Volume III. With 42 Figures (3 of Which are Colored) in the Text, and 47 Colored Figures on 22 Plates. New York: Rebman Company. 1912. Price, \$7.00.

The translation of Krause's work brings to us one of the most comprehensive of the modern treatises on the brain and cord in which every phase of the subject is covered in detail. In this third volume the brain sections are completed and the surgery of the cord covered. As stated before in reviewing the other volumes, the value of the work is greatly enhanced by the introduction into the discussion of complete case histories that bear on the matter in hand. In fact, Krause's methods of handling certain situations are best understood from reading a case history. Three-fourths of the 109 cases of brain tumor operated upon were done in two stages, and from his statistics he finds that of those operated upon in one stage, 66 per cent. died, of those in two stages, 20.85 per cent. died. The statistics refer undoubtedly to the immediate mortality, but it should be added that in 300 cases of extensive brain exposure there has not been a single death from septic meningitis. The attitude toward operation in tumor cases is distinctly hopeful, particularly as from year to year advances in diagnosis are made and the cases are seen earlier by the surgeon.

In the sections dealing with the cord we find that ether is used instead of chloroform (which is the anesthetic used in brain operations) and that Braun's method of local anesthesia has been employed in a number of cases. The laminectomy as now practised is done without removing the spinous processes. The arches are cut by a laminectome similar to a Dohlman forceps. A Doyen burr bores a hole in either arch to admit the forceps. There are many complete and interesting histories that cover most of the points in tumors of the spinal membranes, meningitis, serosa chronica circumscripta, pachymeningitis, intramedullary neoplasmata, etc. In all these conditions operation is indicated. In traumatic cases indication for laminectomy are found, when "isolated fragments of bone or a foreign body cause pressure or where a reduced dislocation resumes its abnormal position and perpetuates serious symptoms." If nervous disturbances continue and if the patient, who improved in the beginning, becomes worse, an operation is indicated. Complete interruption of conduction of the spinal cord is so hopeless a condition that, even "though no sharp indication exist, laminectomy with splitting of the dura, especially in young, strong persons, is to be taken into consideration when orthopedic treatment has failed." Suturing of the cord has shown no good results.

The excellence of the numerous illustrations and plates is as prominent a feature as in the two first volumes.

ORGANIC AND FUNCTIONAL NERVOUS DISEASES. A Textbook of Neurology. By M. Allen Starr, M. D., Ph. D., LL. D., Sc. D., Professor of Neurology, College of Physicians and Surgeons, The Medical Department of Columbia University in the City of New York, etc. etc. Fourth Edition, Thoroughly Revised. Illustrated with 323 Engravings in the Text and 30 Plates in Colors and Monochrome. Philadelphia: Lea and Febiger. 1913. Price, \$6.00.

That a fourth edition of the "Organic and Functional Nervous Diseases" by Dr. Allen Starr has been found necessary attests to its continued popularity among students and physicians. The present edition has been elaborated and enlarged so as to include some of the more recent advances, particularly in regard to the theories of Babinski, Janet and Freud.

The arrangement of the subject-material is very practical and will appeal particularly to the needs of the student.

This textbook of Starr's is chiefly valued because it represents the individual experiences and conclusions of the author. It is, therefore, not in any sense a

compilation, but is a record of the neurological activity of one who has been a pioneer of his subject in this country, and who has personally seen and lived through various evolutionary phases of its development. As a textbook, therefore, Starr's book is of value beyond its mere contents.

The style is easy and compact, so that the statements contained in it are easily understandable; and, in spite of a certain degree of dogmatism, it is fairly interesting reading.

For the student (for which this book is evidently designed) it is an admirable exposition of neurology. For the practitioner it should be of great service as an easy reference book, but for the specialist it would have comparatively little value.

The illustrations are, on the whole, well selected and are taken from authoritative sources.

Some of the plates in the anatomical portion of the book are open to criticism on account of their diagrammatic character. For example, on plate III. there is a picture of neurones in various stages of degeneration. These so-called neurones are represented merely by the cells, and nothing else, and would certainly be very deceptive to a student's understanding of the term.

This book can be recommended to the student as a safe, readable and eminently practical treatise on the subject of neurology.

THE LABYRINTH. An Aid to the Study of Inflammations of the Internal Ear. By Alfred Braun, M. D. (New York) and Isidore Friesner, M. D. (New York). With Fifty Figures in the Text and Thirty-Four Halftones on Thirty-Two Plates. New York: Rebman Company. 1913.

English speaking otologists are to be congratulated on the appearance in their own language of so comprehensive a work on the labyrinth as is this recent work by Braun and Friesner. In no department of otology have such strides been made in recent years as in this, for in no other branch was so little known. Inasmuch as we are almost entirely indebted for this work to the Germans, or more particularly to the Vienna school, it follows that most of the important literature is in the German language. "Though our knowledge of the subject," as stated by the authors in their preface, "is still in the developmental stage, it is necessary for us all to become familiar with those basic truths regarding labyrinthine disease, which have thus far been established beyond doubt." This aim of the joint authors is certainly well carried out in their book. Although containing no original contribution by them, it forms a most complete summary of the literature up to the present time, and states most clearly and precisely the last word of the accepted authorities on this subject.

Under the successive chapters entitled Anatomy, Physiology, Methods of Examination, Pathology, Symptoms and Treatment, the entire field is covered in a most logical and concise manner. The style is clear and distinct, and the many points, at first apparently abstruse, are discussed in such a manner as to leave few misgivings in the reader's mind. The illustrations and schematic drawings, most of which are original, contribute decidedly to the understanding of the text. The work is a decided help to those interested in the subject and should be of value not only to the otologist, but to the internist, and more especially the neurologist.

While commenting on the uniform excellence of the work, we cannot refrain from criticizing the old, and to us antiquated, designations of the various canals—namely, external, superior and posterior, instead of horizontal and anterior and posterior vertical. The indicating, too, of points of interest in the drawings by number or letter, leaving the reader to grope through several lines of fine print at the bottom of the page for explanation, is antiquated and consumes an amount of time as useless as it is unnecessary.

HANDBUCH DER FRAUENHEILKUNDE FÜR AERZTE UND STUDIERENDE. Herausgegeben von C. Menge und E. Opitz. Mit 374 zum Theile farbigen Abbildungen im Text. Wiesbaden: Verlag von J. F. Bergmann. 1913. Price, 16 m.

This latest volume on gynecology is edited by Menge and Opitz, and is the co-operative work of some of the best known of the younger German gynecologists. While it is called a handbook, the volume is really of the nature of a textbook for the student and practitioner. It differs, however, from the usual textbook in its scope and, especially, in its arrangement. The editors' intent is to show gynecological diseases in their natural relations to the entire organism, to diseases of neighboring or other organs; in short, in those very relations in which they occur in practice. For this reason the work is divided into two parts. The first part, dealing with the general problems of gynecology, com-

prises chapters on the development, anatomy, topography and physiology of the urogenital system—an excellent exposé of the problem of proper hygiene and dietetics, by Menge. Baisch describes the general symptomatology of gynecological disorders. Walthard and Opitz consider in detail the mutual effect of gynecological diseases, diseases of the neighboring organs, and of general diseases on each other. Sellheim writes on the methods of examination and Opitz on the general principles of gynecological therapy.

The second part of the work takes up the systemic diseases (sterility, gonorrhea, syphilis, tuberculosis, septic infections, injuries, anomalies of position, and malformations) and concludes with the description of organic diseases as commonly given in textbooks, followed by eight chapters dealing respectively with the diseases of vulva, vagina, uterus, tubes, ovaries, pelvic cellular tissue, and anomalies of the urinary and intestinal tract as affecting the genital organs.

It would be impossible, in this limited space, to enter into a critical discussion of the various views expressed by the different writers, but it would be more than an oversight to omit mention of the excellent judgment of the editors in assigning each subject to a man who has done original work in his particular field, and, therefore, is entitled to his individual opinion, though possibly slightly at variance with the views of others. It is this very fact which gives each subject a value that is unique, and hence makes all the contributions to this volume of equal importance to the student, practitioner and specialist.

AN INTERNATIONAL SYSTEM OF OPHTHALMIC PRACTICE. Edited by Walter L. Pyle, A. M., M. D., Philadelphia, Member of the American Ophthalmological Society. Ophthalmic Semiology and Diagnosis. By Charles H. Beard, M. D., Surgeon to the Illinois Charitable Eye and Ear Infirmary (Eye Department), etc. etc. With Thirteen Colored Plates and Seventy-One Figures in the Text. Philadelphia: P. Blakiston's Son and Company. 1913. Price, \$4.00.

"This book is the outcome of a long-standing conviction on the part of the writer that the rank and file of the medical profession would welcome a treatise—that would deal systematically, succinctly and solely with questions of symptomatology and diagnosis as concern the eye." (Extract from preface.)

This avenue of approach to ophthalmic science has been rarely travelled, indeed it has been carefully avoided systematically by writers on diseases of the eye. And yet it is the road that the oculist, confronted with an individual bearing some ocular abnormality, must necessarily follow. Why then has the ophthalmic world so long been denied a volume devoted exclusively to differential ocular semiology?

Dr. Beard, who is well known as the author of a splendid book on ophthalmic surgery, and whose drawings in color of the fundus oculi received, some years ago, a diploma of honor from the American Medical Association, reveals himself, in the present volume, a master of clinical ophthalmology. He has, too, the happy faculty of being able to impart his knowledge in entertaining and often vivid language. Occasionally what might be called a certain verbal exuberance leads him to an infelicitous choice of words, *e. g.*, p. 69, "the staphyloma in these two counts is bilateral"; p. 68, line 20, the meaning would be clearer if "according" were substituted for "owing." Such lapses may well be forgiven an author who is so happily free from the usual stiff textbook verbiage.

How vivid is this description of the vessels of the separated retina (p. 383): "The aspect of the vessel stems and branches bear the same relations to normal vessels that fresh, crisp, succulent seaweed does to that which has lain in the sun for a day. The branchings are no longer the angles of health, they are but limp curves."

The book is a worthy companion to the volumes of Mayou and Darier, which were reviewed in these columns several months ago.

ETUDES SUR LE SERODIAGNOSTIC ET LE TRAITEMENT DE LA SYPHILIS. Stratégie et Tactique. Par Le Dr. Leredde. Paris: A. Maloine. 1913.

Dr. Leredde has advanced been an advanced thinker upon the treatment of syphilis. He was probably the first to introduce the intensive treatment of cerebrospinal syphilis, and went so far as to state, many years ago, that a large dose of mercury, when properly administered by injection, would in many instances stop the progress of the syphilitic involvement. He has always believed in heroic treatment of syphilis, and the value of his idea upon the subject has been substantiated by modern investigations.

The present work is a thorough discussion of the various methods of the serum diagnosis of syphilis and the treatment of the disease. The first 76 pages are devoted to a technical discussion of the serum diagnosis. The author

sums up, in his conclusion, the value of the various methods which should be extremely serviceable to those in this branch of work. In speaking of the sterilization of syphilitics in the early stage of the disease, he says that three injections of salvarsan in this period will completely sterilize the host in certain instances, which is evidenced by negative serodiagnosis and suppression of all accidents.

The various methods and technique for administering salvarsan are given in detail, together with a detailed discussion of the causes of the minor accidents that occur from its administration. He remarks *en résumé* that the phenomena which are a priori attributed to tolerance or idiosyncrasy of the patient to salvarsan are for the most part due to the action of the therapeutic agent upon the parasite and other lesions. He warns that the injections of salvarsan or neosalvarsan should not be given when the patient is ambulatory.

In summing up his chapter upon the care of tabes dorsalis by the use of the salts of Ehrlich, he says the use of salvarsan or neosalvarsan, in prolonged normal doses in series, attenuates tabes, and frequently leads to a clinical cure, characterized by the disappearance of recent symptoms and a great number of the old symptoms. In other words, it arrests the evolution of the disease.

One must remember, however, that Dr. Leredde is an enthusiast and optimist, but we need enthusiasm and optimism when we deal with the subject of cerebrospinal syphilis. A perusal of this book is refreshing and encouraging.

A COURSE IN NORMAL HISTOLOGY. A Guide for Practical Instruction in Histology and Microscopic Anatomy. By Rudolph Krause, A. O. Professor of Anatomy at the University of Berlin. Translation from the German by Philipp J. R. Schmahl, M. D., New York. Parts I and II. New York: Rebman Company. 1913. Price, \$0.75 and \$5.50.

These two handsome volumes, while written for German students, are, in their English dress, a valuable work for American laboratories, and the reviewer congratulates the publishers upon their enterprise in bringing out this translation.

The work is written from the modern standpoint and is especially to be commended for its practical character. The student is not merely to be the witness of demonstrations, but actually has to perform the manipulations necessary to secure the specimens he studies. Histology is regarded as a part, really the groundwork, of anatomy, and the microscope is its handmaid. This work is a clear and methodical guide for the best kind of a course in microscopical anatomy.

Volume I covers the technique of microscopy necessary for the work to be done, while the second volume is devoted to histology in its relation to medicine. Volume I is profusely illustrated with text figures, while Volume II, in addition to the text illustrations, contains ninety-eight original colored plates of a high order of scientific merit and most beautifully reproduced. Every figure and plate is carefully and clearly explained, and the details of technique necessary for the preparation of each specimen is given *in extenso*.

The entire work is admirable in conception and execution and fulfils its purpose well. As a textbook both upon the practical and theoretical aspects of medical histology, it should take a high place.

PATHOLOGICAL INEBRIETY: ITS CAUSATION AND TREATMENT. By J. W. Astley Cooper, Medical Superintendent and Licensee of Ghyllwood Sanatorium, Near Cockermouth, Cumberland. With Introduction by Sir David Ferrier, M. D., F. R. S. New York: Paul B. Hoeber. 1913. Price, \$1.50.

There have of late been published a number of small books on the subject of inebriety, one of which has already been reviewed in these columns. The present volume by Cooper is a good example of this kind of practical monograph. In a comparatively brief space is included all that we know at the present time concerning the treatment and handling of cases of inebriety.

The author's classification is eminently serviceable, particularly in respect to the differentiation of what he calls dipsomania from pure alcoholism. Under the term dipsomania he includes a definite psychosis. He defines dipsomania as a form of periodic insanity, of which an uncontrollable impulse to intoxication is the most prominent but by no means the only symptom of a periodic psychophysical disturbance.

The various methods of drug treatment, both new and old, are included in this book, with careful directions as to their use and the author's personal experience with them.

Of particular interest is Cooper's experience with the so-called Lambert treatment, of which we in America have of late been hearing so much. The author

is of the impression that the effect of the Lambert treatment is not due so much to the rather complicated chemical formulæ that are used as to the effect on the patient's mind of the impossibility that these drugs should fail.

To all those who come in contact with cases of alcoholism, or dipsomania in its various forms, this little treatise would be of great value.

A MANUAL OF VENEREAL DISEASES. Introduction by Sir Alfred Keogh, K. C. B., Late Director-General of the Army Medical Service. History, Statistics, Invaliding, etc., Brevet Colonel C. H. Melville, R. A. M. C., Late Professor of Hygiene, Royal Army Medical College. Clinical Pathology and Bacteriology, Brevet Colonel Sir William Leishman, K. H. P., F. R. S., R. A. M. C., Professor of Pathology, Royal Army Medical College. Clinical Course and Treatment, Major C. E. Pollock, R. A. M. C. Second Edition. Revised and Largely Re-Written. With New Matter by Major L. W. Harrison, R. A. M. C., Clinical Pathologist, Military Hospital, Rochester Row. New York: Oxford University Press. 1913. Price, \$3.75.

Such rapid strides have been made in the advancement of our knowledge of syphilis that the ink is hardly dry in a volume upon that subject before it is almost out of date. 200 pages of the 314 of this volume are devoted to syphilis. The first 22 pages of the book include a short history of venereal diseases and a discussion of the methods for their prevention. The pages devoted to syphilis embrace a complete discussion of the subject from the most modern standpoint, including the serum diagnosis of syphilis, methods of demonstrating the spirochæta together with the relationship of the luetin reaction and cerebrospinal fluid in that disease. The various methods of treating syphilis are discussed in detail in such a manner that there can be no doubt as to the meaning of the authors. Their statements are clearly and definitely made. Such a book should be of great value to anyone who wishes to obtain a short and concise treatise upon the modern methods and ideas in relation to syphilis.

LABORATORY METHODS, With Special Reference to the Needs of the General Practitioner. By B. G. R. Williams, M. D., Member of the Illinois State Medical Society, American Medical Association, etc., Assisted by E. G. C. Williams, M. D., Formerly Pathologist of Northern Michigan Hospital for the Insane, Traverse City, Michigan, With an Introduction by Victor C. Vaughan, M. D., LL. D., Professor of Hygiene and Physiological Chemistry, and Dean of the Department of Medicine and Surgery, University of Michigan, Ann Arbor, Michigan. Second Edition. Illustrated with 43 Engravings. St. Louis: C. V. Mosby Company. 1912. Price, \$2.50.

This book is written primarily in consideration of the needs of those practitioners in the smaller towns who often have not the usual advantages and conveniences which are considered a prerequisite for laboratory work. If the book does nothing else than convince the reader that a laboratory capable of answering to the most varied needs of the general practitioner is not only possible, but may be had with a minimum of effort and expense even in rural districts, it will have done a valuable service. It should in addition prove a handy guide when such a laboratory has been established. The book does not attempt to present a multiplicity of tests and methods, the authors being content to advance one or two tests for a given purpose. This allows them to cover a wide range of subjects and yet keep the book within a suitable size. In certain parts of the book appear paragraphs which properly belong to the realm of physical diagnosis and which might well have been omitted.

LEHRBUCH DER SPEZIFISCHEN DIAGNOSTIK UND THERAPIE DER TUBERKULOSE. Fuer Aerzte und Studierende. Von Dr. Bandelier, Chefarzt des Sanatoriums Schwarzwaldheim in Schoenberg bei Wildbad, und Dr. Roepke, Chefarzt der Eisenbahnheilstaette, Stadtwald in Melsungen bei Cassel. Siebente, gaenzlich umgearbeitete Auflage. Mit einem Vorwort von Wirkl. Geh. Rat Prof. Dr. R. Koch, Exzellenz. Mit 25 Temperaturkurven auf 7 Lithographischen Tafeln, 2 Farb. Lith. und 5 Textabbildungen. Wuerzburg: Curt Kabitzsch. 1913. Price, 8.30 m.

This work, in the original, has gone through seven editions in four years, and has been translated into seven languages, two of the translations appearing in second editions—probably no further comment on the calibre of this splendid book is necessary. The book is a carefully compiled work on the use of tuberculin in the diagnosis and therapy of tuberculosis. The first part presents the theoretical problems involved; the second part deals with the use of tuberculin in diagnosis, described first in a general way, and then with reference to the

special organs involved, a separate paragraph being devoted to its use in children; the third part takes up the specific therapy of tuberculosis and discusses the relative merits of the various tuberculins and sera used by different individuals, with the variations in technique demanded by the special organ involved. The type and paper are excellent, with 300 references to the literature, and undoubtedly a perusal of its 300 odd pages will prove of benefit to those interested in the subject—and that should include us all.

UNTERSUCHUNGEN UEBER DIE ARNETHSCHES METHODE DER BESTIMMUNG DES NEUTROPHILEN BLUTBILDES UND DAS NEUTROPHILE BLUTBILD BEI GESUNDEN. Von Alex von Bonsdorff, Chefarzt der Lungenheilstalt Nummela-Sanatorium in Finnland. Mit 4 Kurventafeln. Wuerzburg: Verlag von Curt Kabitzsch. 1913. Price, 7 m.

Arneth's criterion of the blood-picture, as is well known, is based upon the following theory. The younger the neutrophil leucocyte, the less branched its nucleus. The youngest cells have an oval nucleus, the oldest a five-branched one. The greater the proportion of single or few-branched nuclei, the greater the proportion, in the blood, of young and recently introduced neutrophil cells. If the total number of nuclear branches per hundred neutrophil cells is determined, a number is obtained that expresses Arneth's blood-picture. The lower this number the greater the proportion of young leucocytes in the blood. Most infections are characterized by a reduction of this number. The theory has found equally strong advocates and antagonists. The writer has subjected the entire question to a searching investigation and comes to conclusions that fully substantiate Arneth's views. The monograph will repay reading by anyone interested in hematology.

SKIN DISEASES IN GENERAL PRACTICE. Their Recognition and Treatment. By Haldin Davis, M. B., B. Ch., B. A. Oxon., F. R. C. S. Eng., M. R. C. P., Physician in Charge of the Skin Department, Paddington Green Children's Hospital, etc. etc. New York: Oxford University Press. 1913. Price, \$3.75.

Haldin Davis has made a very praiseworthy effort to assist the puzzled general practitioner in his attempt to diagnose and treat diseases of the skin. His book follows somewhat the method of Sabouraud, who has given us a book upon topographical dermatology. The body is divided into various regions and the diseases of the skin, most commonly occurring in those parts, is discussed. The first part of the book is devoted to the general discussion of etiological factors, particularly the common pyogenic organisms affecting the skin. The author follows an old clinical definition of eczema and calls it "an inflammatory process of the skin characterized by edema, erythema, formation of vesicles, and the discharge of serum." Perhaps this is as good a definition as any, as it includes all types of traumatic and chemical dermatitis. The clinical features of the diseases and the differential diagnosis are particularly well done. The plates and photographs are excellent, and we must congratulate the author upon having presented us with a very valuable work.

SURGERY OF DEFORMITIES OF THE FACE, INCLUDING CLEFT PALATE. By John B. Roberts, A. M., M. D., Professor of Surgery in the Philadelphia Polyclinic, Surgeon to the Methodist Hospital; Formerly Assistant Eye and Ear Surgeon to the Children's Hospital, and Demonstrator of Anatomy in the Philadelphia Dental College. Illustrated with 273 Figures. New York: William Wood and Company. 1912. Price, \$3.00.

The initial chapter of this book has an interesting review of the development of plastic surgery which in America was fathered by Muetter, and it was this teacher who interested the author in this particular surgery to which he has devoted much of his energy. He has produced a volume that is a fund of information on the subject, available to those who have special problems in this field and need assistance. Throughout the book are the experiences of the author, and the results of the operative correction of deformities by plastic surgery are graphically shown by excellent illustrations from photographs and sketches.

MEDICAL ELECTRICITY. A Practical Handbook for Students and Practitioners. By H. Lewis Jones, M. A., M. D., Fellow of the Royal College of Physicians of London, etc. etc. Philadelphia: P. Blakiston's Son and Company. 1913. Price, \$4.00.

This sixth edition by the English authority furnishes a most satisfactory exposition of the principles and practical application of electricity as a therapeutic

agent. The author has achieved an eminent position in the medical world because of his conservative estimation of this specialty. He has always exhibited a critical attitude in the analysis of electric therapy and has put down in this book the results of painstaking research into the merits of his own methods and the published experiments of others. The chapter upon x-rays is short, but filled with matter which indicates that the author has made a study of the subject.

The newer forms of electrical energy such as diathermy, oscillatory discharges and ionic medication are amply discussed. We would especially recommend to surgeons, orthopedists and neurologists the chapter upon nerve- and muscle-testing by interrupted or continuous currents and condenser discharges, the latter being especially valuable as a qualitative test.

The entire book is acceptable to disciple and critic, because of the fairness and conservatism displayed with its text.

THE PRINCIPLES AND PRACTICE OF OBSTETRICS. By Joseph B. DeLee, A. M., M. D., Professor of Obstetrics at the Northwestern University Medical School, Obstetrician to the Chicago Lying-in Hospital and Dispensary, etc. etc. With 213 Illustrations, 150 of Them in Colors. Philadelphia and London: W. B. Saunders Company. 1913. Price: cloth, \$8.00; half morocco, \$9.50.

No attempt can be made to consider here in detail this latest work on obstetrics. It must suffice to state that the reader will be impressed by the fact that it has been written by a man who has had a large personal and practical experience; by a man who, while thoroughly familiar with the views of all workers in the field, seems to base his opinion on his own observations and results; by a man who is accustomed to talk to students. These qualifications have enabled the author to produce a volume which presents all that is known about obstetrics, not in the form of an impersonal encyclopedia, but as a true and clear picture of what obstetrics, at least from DeLee's standpoint, should mean to the student who is preparing to practise obstetrics according to scientific, practical and effective rules. There are a few minor defects—occasional mistakes, omissions, and especially repetitions, but not enough of them to mar the value of this excellent book. It is well written, splendidly illustrated, and its general appearance leaves nothing to be desired.

HANDBUCH DER PRAKTISCHEN CHIRURGIE. Bearbeitet und Herausgegeben von Geh. Rat Prof. Dr. P. von Bruns, in Tuebingen, Geh. Rat Prof. Dr. C. Garre, in Bonn, und Geh. Rat Prof. Dr. H. Kuettner, in Breslau. Vierte umgearbeitete Auflage. Fuenf Baende. III. Band. Chirurgie des Bauches. Mit 169 teils farbigen Textabbildungen. Stuttgart: Verlag von Ferdinand Enke. 1913. Price, 25 m.

This, the third volume in the fourth edition of the "Handbuch der Praktischen Chirurgie" differs only in a few particulars from the same volume of the first edition. Diseases of the peritoneum and the general technique of laparotomy are described by Kœrte, whereas in the earlier editions, Mikulicz handled these subjects; Kausch contributes the chapter on stomach and intestines, and Sonnenburg that on appendicitis.

Aside from the rather complete revision of the chapter on appendicitis by Sonnenburg, in which he formulated the views he has so consistently expressed in current literature, for the past ten years, the volume shows no innovations. Nevertheless, the new edition of this system of surgery is an essential to any library that pretends to completeness, since it represents the best in contemporary German surgical thought.

THE PROSPECTIVE MOTHER. A Handbook for Women during Pregnancy. By J. Morris Slemmons, Associate Professor of Obstetrics, The Johns Hopkins University. New York and London: D. Appleton and Company. 1912.

The educated woman of to-day during pregnancy demands from her physician definite advice concerning the preservation of her own health and that of the child to be born. She desires knowledge of the anatomical and physiological changes incident to the development of the fetus and the birth of the child.

To supply such information the author has endeavored—to use his own words—to reproduce the well-known textbook of his teacher and friend, Whitridge Williams, "in words of one syllable."

The result of his labor is an attractive, well-written volume, full of correct information and valuable advice; a book presenting scientific facts in plain language; a work which fills a long felt want and which can safely be placed in the hand of every prospective mother seeking information to which she is certainly entitled.

GEBURTSHILFliches VADEMEKUM. 100 Faelle aus der Geburtshilfe fuer die Praxis. Bearbeitet nach den "Seminaristischen Uebungen" des Herrn Geh. Rat Professor Dr. Leopold, Ehem. Direktor der Kgl. Frauenklinik zu Dresden. Von Professor Dr. Richter, Frauenarzt zu Dresden. Mit 25 Figuren und 1 Doppeltafel. Leipzig: Verlag von F. C. W. Vogel. 1913. Price, 8 m.

In this country the long, tedious didactic lecture is being rapidly replaced by the more individual instruction at the bedside. Teachers of obstetrics will find valuable suggestions concerning effective practical instruction in this volume collated from Leopold's famous clinics in Dresden. The prominent symptoms are succinctly stated and the findings in each obstetric case are given. Three questions follow. Extensive and carefully prepared answers then set forth all the essential features of diagnostic, prophylactic, or therapeutic importance.

By the careful selection of one hundred cases, the writers find the opportunity to discuss, in a most instructive manner, practically every problem of obstetrics. This volume serves the views held by Leopold and his followers, and guides other teachers in their attempts to use obstetric material properly and effectively for the instruction of medical students.

THE VOLATILE OILS. By E. Gildemeister and Fr. Hoffmann. Second Edition by E. Gildemeister. Written under the auspices of the firm of Schimmel and Company, Miltitz near Leipzig. Authorized Translation by Edward Kremers, Madison, Wis. First Volume. With Two Maps and Numerous Illustrations. New York: John Wiley and Sons, Inc. 1913.

Eleven years have passed since the publication of the first edition. During this period, enormous progress has been made, scientifically as well as practically in the realm of the volatile oils. The composition of the older ones has been cleared up and numberless new ones have been discovered. The discussion of these modern advances will, however, fall to the second volume, the first being chiefly historical in its scope. While the title of the book would not tempt the general reader, anyone bold enough to look between the covers would find his curiosity well rewarded. From the Greeks and Romans to the Portuguese and Dutch spice hunters, the text skips to and fro, enlivened by anecdotes and descriptions of medieval chemical methods. The material for many an entertaining magazine article may be found here.

DIAGNOSTIC METHODS. Chemical, Bacteriological and Microscopical. A Textbook for Students and Practitioners. By Ralph W. Webster, M. D., Ph. D., Assistant Professor of Pharmacological Therapeutics and Instructor in Medicine in Rush Medical College, University of Chicago, etc., etc. Third Edition, Revised and Enlarged with 37 Colored Plates and 164 Other Illustrations. Philadelphia: P. Blakiston's Son and Company. 1913. Price, \$4.50.

The fact that only one year has passed since the publication of the previous edition speaks well for the popularity of the book. A number of important additions have been included, among them Darling's method of staining amebae, Pappenheim's panoptic stain, Abderhalden's sero-diagnosis of pregnancy and many others. It will be found a useful book of reference for medical laboratory work.

UNSER HERZ EIN ELEKTRISCHES ORGAN UND DIE ELEKTROTHERMIE DER WARMBLUETER. Von Dr. Georg Hirth, Verfasser von: "Der elektrochemische Betrieb der Organismen," etc. Zweite Auflage. Muenchen: Verlag der "Jugend." 1913.

Hirth has found, he believes, a formula that solves many a physiological riddle. The fundamental factor in all life is electricity and, in all living tissues, the salts are most indispensable, being, in their capacity of electrolytes, the bearers of the vital electricity. The ills of the flesh are due to the fact that the potential of this vital electricity is so low that it is easily influenced by external agencies. The heart is the central station of the body's electrochemical activity, while the brain has a regulating power over this electricity. Hence, the prime importance of these two organs for the vital economy.

FORMULAIRE ASTIER. Vade-Mecum de Médecine Pratique (Médecine, Chirurgie, Obstétrique.) Thérapeutique et Pharmacologie. Paris: Vigot Frères, Editeurs. 1913. Price, 8 fr.

This formulary is gotten up along the familiar lines. French therapeutic procedure, however, differs in many respects from that current here. The American reader will find in these pages many drugs, especially in the matter of herbs, that are entirely unfamiliar to him. It may well be that he will at times meet with suggestions of value.

WHAT HEART PATIENTS SHOULD KNOW AND DO. Suggestions for Persons Suffering from Diseases of the Heart and Blood Vessels. Exercise, Diet, Prevention, etc., and Advice as to the Regulation of Their Lives. By James Henry Honan, M. D., Rush Medical College (University of Chicago), M. D.; Imperial Friedrich Wilhelm University of Berlin, M. D., etc. etc. New York: Dodd, Mead and Company. 1913. Price, \$1.20.

At Bad Nauheim, Dr. Honan has had an opportunity to see an unusual number of cardiac patients of all sorts. Convinced that proper hygiene and a suitable mode of life will often greatly prolong the existence and usefulness of those suffering from an impaired heart, he has embodied his ideas on the subject in this little book. It is intended primarily for the patient himself and can with confidence be put into the latter's hands. The physician too will find it useful reading. It will remind him of the detailed advice, as to food, sleep and manner of life, which we are too apt to take for granted and about which we too often neglect to give our heart patients exact instructions.

INSURANCE MEDICINE. Being Suggestions to Medical Examiners. By Henry H. Schroeder, M. D., Medical Director, Mutual Life Insurance Company of New York, Editor Insurance Department, Medical Record. Reprinted from the Medical Record. New York: William Wood and Company. 1913. Price, \$2.00.

Life insurance examination differs in many respects fundamentally from the routine examination of patients. The latter come to the physician with more or less definite complaints, the source of which must be investigated. The former are ostensibly in perfect health and a concealed or unsuspected defect, if present, must be detected. The examination of the insurance applicant must therefore be approached from a somewhat different standpoint from that of the patient.

The writer of this little book approaches the subject of the home office. His aim is to impress upon the examiner the necessity of applying the results of modern medical research to his work. The slipshod examiner is lacking not only in self-respect, but in his duty to the company that employs him.

EXPLORATION RADIOGRAPHIQUE DE L'APPAREIL URINAIRE. By Professeur F. Legueu, E. Papin et G. Maingot. Clinique des Maladies des Voies Urinaires (Hôpital Necker). Avec 72 planches hors texte, dont 67 en noir et 5 en couleurs. Paris: Société d'Éditions Scientifiques et Médicales. 1913.

This book by leading French authorities presents genito-urinary radiography most completely. There is much original work upon bladder radiography after the introduction of opaque media, especially in the presence of bladder tumors and diverticula. The physiology of the bladder after opaque injections has been studied in the male and female normals, as well as in the presence of disease and after prostatectomy. The renal circulation is presented after opaque injections in normals and pathological specimens. The illustrations are splendidly reproduced and are quite profuse. Pyelography, which has lately become quite common, is well illustrated and described. A generous bibliography is appended. The whole book is extremely satisfactory and completely covers the field of its title.

NERVOUS BREAKDOWNS AND HOW TO AVOID THEM. By Charles D. Musgrove, M. D. New York: Funk and Wagnalls Company. 1913.

How is one to avoid nervous breakdowns? Obviously by living the hygienic life: plain food, sufficient outdoor exercise and sleep, no excessive worry. Directions couched in these general terms, however, rarely suffice. Detailed instructions are required of the physician, and for this he has too often neither the time nor the patience. A book, such as this of Musgrove, readable and anecdotal, sane and detailed, suitable to be put into the hands of the nervous patient, may well prove a welcome aid to the busy physician.

WUERZBURGER ABHANDLUNGEN AUS DEM GESAMTGEBIET DER PRAKTISCHEN MEDIZIN. XIII Band. 9 Heft. Beitrag zur Kenntniss des Lupus vulgaris der oberen Luftwege. Von Dr. Fritz Till. Wuerzburg: Curt Kabitzsch. 1913. Price, 0.85 m.

Until recently, dermatologists were far too apt to overlook the fact that lupus of the face almost always involves one or more of the mucous membranes. Many a case has been discharged as cured with the nasal mucosa still badly infected. A summary of the modern standpoint, in this matter, illustrated by an interesting series of clinical histories, will be found in this monograph.

UEBER DIE STELLUNG DER GESCHWUELSTE UNTER DEN NATURERSCHEINUNGEN. Von Prof. Dr. F. de Quervain, Direktor der Chirurg. Universitäts-Klinik in Basel. Vortrag, gehalten in der naturforschenden Gesellschaft in Basel am 19. Februar 1913. Leipzig: Verlag von F. C. W. Vogel. 1913. Price, 1.50 m.

In this little monograph of twenty-five pages, de Quervain surveys the tumor problem from the point of view of the biologist. He specifically disclaims any intent to establish a new theory, and states that his faith is still pinned to the theory of growth as a result of irritation. Under three separate heads he discusses the phenomena of growth, inflammation and tumor formation, showing the fundamental points in common; he makes clear the resemblances between the ordinary somatic cells and the cells constituting tumors, and, finally, after pointing out that his discussion serves largely to emphasize the inherent intricacies of the tumor problem, he utters the hope that a full knowledge of the difficulties involved will inspire a larger amount of intensive experimental work.

MEDICAL SUPERVISION IN SCHOOLS. Being An Account of the Systems at Work in Great Britain, Canada, the United States, Germany, and Switzerland. By Edward Millar Steven, M. B., Ch. M. (Edinburgh), Royal Commissioner for South Australia, 1909. London: Baillière, Tindall and Cox (Chicago Medical Book Company). 1910.

As commissioner for South Australia, the writer examined the methods of school inspection in Great Britain, Canada, Germany, Switzerland and this country, the book being the outcome of his investigations. His method of presenting the subject is somewhat unusual. He treats each town or district separately, describing in detail the methods in use there and illustrating his narrative by copious facsimiles of the report blanks in use and by frequent photographic illustrations. The book should be invaluable to the school board desirous of introducing a system of school inspection and to the examiner ambitious to improve his methods.

MECHANICAL TREATMENT OF ABDOMINAL HERNIA. By William Burton DeGarmo, M. D., Professor Special Surgery, New York Post-Graduate Medical School and Hospital, etc. etc. Philadelphia and London: J. B. Lippincott Company. 1913. Price, \$1.50.

It is undoubtedly true that in certain instances a truss must be prescribed for the control of hernia. It is equally true that even our larger works on surgery have practically nothing to say on the important subject of truss-fitting.

This small volume by DeGarmo fulfils, therefore, a specific need, and, moreover, it fills it satisfactorily. After a short discussion of the anatomy, symptomatology and treatment of hernia, there follows a detailed description of the various types of truss for the various types of hernia, with a clear statement of the advantages and disadvantages, excellences and defects of the different trusses described.

LA SYPHILIS EXPERIMENTALE. Dans ses Rapports avec la Clinique. Clartés apportées par l'Expérimentation à la connaissance de la Syphilis humaine. Par H. Gougerot, Professeur Agrégé à la Faculté de Médecine de Paris. Paris: Masson et Cie, Editeurs. 1913. Price, 1 fr. 25.

The discovery by Schaudinn of the micro-organism responsible for syphilis and the demonstration by Roux and Metchnikoff that the disease can be inoculated into animals have revolutionized our ideas regarding this affection. The work of the experimenter has influenced profoundly both the ideas and the practice of the clinician; too often, however, the latter does not definitely know the experimental data that underlie his therapeutic methods. A number of monographs have appeared recently to supply this need, none better than this essay of Gougerot's. In brief compass it describes the work done to date on experimental syphilis.

THE BRADSHAW LECTURE ON THE BIOLOGY OF TUMORS. Delivered at the Royal College of Surgeons of England on Thursday, December 5th, 1912. By C. Mansell Moullin, M. A., M. D. Oxon., F. R. C. S., Consulting Surgeon to the London Hospital, etc. etc. Published by Request of the Council of the Royal College of Surgeons of England. London: H. K. Lewis. 1913. Price, 2 s. 5 d.

In this small brochure, the author outlines an excellent kaleidoscopic view of the most modern thought on tumor formation and growth. There is a refreshing absence of vain hypothesis. In clear, concise and simple fashion, the develop-

ment of tumors from buds of tissue is described. The relationship between differentiation of structure and growth, the classification of somatic and germ cells and the relative attributes of these two fundamental types, the essential biological differences between the groups of benign and malignant tumors, the significance both of involution and evolution, the inheritance of tumors, and, finally, the possible cure of tumors are discussed in an admirably clear expository fashion.

KRANKHEITSENTSTEHUNG UND KRANKHEITSVERHÜTUNG UND GEHEIMNISSVOLLE LEBENSAUSSERUNGEN DES KOERPERS. Oeffentliche im hamburgischen Vorlesungsgebäude in den Wintern 1911 und 1912 gehaltene Vorlesungen. Von Dr. Hans Much, Oberarzt am Eppendorfer Krankenhause. Mit 22 Abbildungen im Text. Wuerzburg: Verlag von Curt Kabitzsch. 1913. Price, 3 m.

These addresses were delivered, before the pupils of the Hamburg high schools, during the winters of 1911 and 1912. In a most entertaining fashion, the writer describes the most important advances in medicine, being at once popular and accurate. Our popular essays on medical matters, as they are to be found in the newspapers and magazines, are often so exaggerated and misleading that the appearance of a similar exposition in English would be most welcome.

LES PREJUGES EN DIETETIQUE ET DANS LES MALADIES DES VOIES DIGESTIVES. Par le Docteur A. Mollière. Paris: A. Maloine, Editeur. 1913. Price, 3 fr.

In France, as in other countries, certain prejudices in regard to medical matters have taken firm root among the laity. One of these, for instance, is the conviction, nearly universal among French midwives and mothers, that every infant at the close of the first week of its life must receive a dose of castor-oil. Other baseless notions, such as the common occurrence of rheumatic affections of the digestive tract, the necessity for an appetizer (*apéritif*) before meals and the like, are hardly less prevalent. The writer devotes a chapter to each of these illusions. While the book is intended rather for the lay reader, it is so cleverly and amusingly written, that the physician will be entertained and sometimes edified by its perusal.

BEITRAEGE ZUR KLINIK DER INFektionsKRANKHEITEN UND ZUR IMMUNITÄTsforschung (MIT AUSSchluss DER TUBERKULOSE). Herausgegeben von Professor Dr. L. Brauer. Redaktion: Fuer die Originale: Dr. H. Schottmueller und Dr. H. Much. Fuer die Ergebnisse: Prof. Dr. H. Luedke. I. Band, 2 Heft. Wuerzburg: Verlag von Curt Kabitzsch. 1913.

The second number of this important journal has just appeared. Its contents are in no wise inferior to that of the first number. Among the contributors may be named Hegler (sialadenitis), Hannes (framboesia), Abderhalden (sero-diagnosis), Leschke (serology of tumors), and others. An interesting discussion of Arneth's blood method, pro and con, by Arneth and Schilling closes the number. An interesting series of articles is announced for the third issue.

LES ICTERES TOXIQUES ET LEUR TRAITEMENT. Par Noël Fiessinger, Ancien interne lauréat des Hôpitaux, Chef de clinique thérapeutique à la Faculté de Médecine de Paris. Paris: A. Maloine, Editeur. 1913.

Most authors classify icterus as hepatogenous and hematogenous. The tendency among English and German writers is to minimize the importance of the latter group; that of the French and other Latin writers to emphasize it. Most cases of so-called catarrhal jaundice they consider toxic in origin, and many another case, which most of us might consider obstructive in origin, they would interpret otherwise. The French view, based as it is upon extensive experimental evidence, is well put forth in Fiessinger's monograph and deserves careful study.

BLOOD-PRESSURE IN GENERAL PRACTICE. By Percival Nicholson, M. D. With Seven Illustrations. Philadelphia and London: J. B. Lippincott Company. 1913. Price, \$1.50.

Had Dr. Nicholson's little book no further reason to commend it beyond the persistent plea to study diastolic pressure and thus pulse pressure, it were indeed worth while, since the common tendency to-day rests with the systolic reading.

The subject-matter is arranged in such logical sequence, and is withal so clearly, simply and instructively set forth that it cannot help but appeal alike to all.

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EDITORIAL.

LAUGHTER AS A THERAPEUTIC MEASURE.

It is with a sense of extreme satisfaction that the regular reader of our various weeklies and monthlies must view the fact that occasionally even the most ponderous among them indulge in the relaxation of publishing lightsome articles or communications which are a delightful break in the otherwise somewhat dreary and monotonous contents; but what is more to be enjoyed by the regular reader, provided he is gifted with a sense of humor, is the article or letter put forth with a sense of gravity that is so out of proportion to the production that the seriousness thereof cannot but wreath his face in what to be charitable we will call a smile. Of the latter sort of writing, the letter entitled "Cure by Laughter," which appeared in the *British Medical Journal* of October 11th and has for its signature F. de Havilland Hall, is surely a very good illustration, for the writer gravely records a cure by laughter, by comparison with which all those marvellous cures effected at Lourdes through religious fervor and the triumphs of modern drugs, even when vouchsafed for by eminent medical men, dwindle into insignificance. The unusual lines run thus: "When I was about twenty-three years of age I had a very severe attack of quinsy; swallowing was almost impossible and breathing difficult. The surgeon in attendance was about to incise the tonsil, but while waiting for a scalpel he took up the 'Ingoldsby Legends,' which happened to be lying on the table. He proceeded to read the diverting history of 'The Lady Rohesia,' and how she was cured of her quinsy. In spite of the miserable condition in which I was, the story caused me to laugh, and this led to the bursting of the abscess, and to my cure without the use of cold steel."

This letter, be it stated at once, was written in approval of an article in the *France médicale*, quoted by the *British Medical Journal* the week

before, and which had for its kernel the passage from Dulaure's "Extrait des singularités historique" in which is related the grave illness of the Duke of Angoulême, natural son of Charles IX, who was stricken whilst with the army and was compelled to remain at Meulon. The physician in attendance whispered rather loudly, in the presence of the patient, his innermost thoughts of the case to a confrère, framing them, it is true, in Latin, but the Duke knowing this language, directly he heard the ominous words *Non vacat periculo*, thought it high time to settle his spiritual affairs with his confessor for whom he at once sent. But though the physician was fully aware that the case was hopeless, he bethought him of a measure that was completely divorced from herbs and simples, but that might be tried because, even though it might fail in giving relief, it had one great virtue that the therapy in those days did not have—it would neither sicken the patient nor deprive him of blood. In short, the Duke had to be made to laugh. To effect this, three elderly men clothed in white, two with red caps with cock's feathers on their heads, the other with a captain's hat, were brought before the patient and at once engaged in a bit of buffoonery which had for its object the knocking off of each other's hats. Ere long the royal patient laughed hilariously, there was bleeding from his nose—this, we take it, was quite unexpected—the fever which had lasted some twenty-two days abated, and in six days the improvement was no longer doubtful.

Henri Bergson in his book on "Laughter" says: "Several have defined man as 'an animal which laughs.' They might equally well have defined him as an animal which is laughed at." Now if this is true, though we may not appreciate to the full the curative value of laughter in disease, we can nevertheless easily understand why it is that man is moved to laughter even despite pain, and how if his sense of humor is developed the bearing of pain may become more tolerable. In fact, on further thought, what an asset laughter would be to our modern therapy which fairly bristles with complications as regards technique and is really an argumentative and disputatious affair at best!

Here, indeed, is a simple means to dispel pain, so simple that we fear those of a scientific nature in the medical profession will look askance at it. But has not music been tried and found successful in some cases, though here again the argumentative and disputatious spirit became rampant in our controversies as to its excellences; for directly the playing of soothing or tumultuous compositions was advocated there arose many pros and cons with the result that music as a curative agent is doubted in certain high quarters. Laughter, on the other hand, need not fear a like criticism, for who can deny that it is always welcome in the sick-room? Still, though we have welcomed it, have we really thought deeply enough on the subject of its curative qualities? In our blind worship of modern

drugs we have somehow overlooked its worth and value in the exalted places of our therapy; but, now that these two instances which we have cited are known, can we continue to be obdurate? It may be that the "Ingoldsby Legends" will not be lying on the table or that the three buffoons will not be at hand to entertain with side-splitting jokes; but, even with these disadvantages, could not the physician in attendance relax during some minutes, relate a joke suited to the case, dance a *pas seul*, or burlesque the weaknesses of a professional brother whom the patient might happen to know? Certainly in the medical profession there must be some buffoons who, under a cloak of cold austerity induced by the scientific habit, carry a smouldering fire of rather coarse and vulgar humor which they are ashamed to expose to the light of day lest someone denounce them as unrefined. A little encouragement might effect the disengagement of this valuable item in our modern therapy from its present barriers so that no longer in quinsy will a patient have to undergo the tortures of "cold steel" or be host to a fever for twenty-two days!

ON THE REHABILITATION OF CERTAIN DISTINGUISHED PERSONS.

It would seem that besides being just as busy this year with their respective practices as they were last year or for that matter for a number of years, a number of foreign physicians are doing a deal of work in the matter of rehabilitating certain literary personages, so that in the future we may be in a position to speak of them quite openly as almost perfect types of ladies and gentlemen. Just why this moral wave should sweep certain members of the medical profession at this time is beyond the knowledge of the writer of these lines; but if what is happening in French medical circles to-day should be imitated by American physicians—and since we imitate so much that is born in France, we feel that this also may be patterned after—there is no telling how near in the future some valiant American physician may not sacrifice his respectable position in his community by telling us that Edgar Allan Poe could have been received without demur in the most respectable and bourgeois society and Walt Whitman honored as an ornament in the home life of any God-fearing merchant despite the onslaught on his moral character made by Dr. W. C. Rivers in his book, "Walt Whitman's Anomaly." But before this is done by the American physician who knows naught of fear in the face of withering criticism, let us consider briefly what Drs. Bascoul and Barras have written on two literary people of renown—Sappho and Restif de la Bretonne—in the respective studies of their lives. Dr. Bascoul's work is already two years old, but by means of the criticism of Dr. Raoul Lecoutour in *Le Progrès Médical* of June 7th it is brought to date; and what both

author and critic tell us of the famous Greek poetess is well worth listening to, provided we are open to new ideas. What first aroused Dr. Lecoutour's suspicions in regard to the moral lapses attributed to the poetess was the passage in Herodotus in which 'the Father of History' mentions her indignation, expressed in verse, when she heard that her brother Charaxus was living with the courtesan Rhodopis. The question which Dr. Lecoutour asked himself was, Why should Sappho have been so outraged if she herself led a life that merited deep reproaches? And then he read Dr. Bascoul's illuminating study and forthwith not only met a congenial spirit but one who was in accord with his views. To abbreviate as much as possible the account of Dr. Bascoul's 'findings,' we hasten to tell the reader that all those much-quoted and widely circulated stories about the private life of the great lyric poetess are fiction, that the tragic episode involving Phaon is a legend, and that, on account of Sappho's genius and the prominent part she took in the emancipation of her sex in the fourth century B. C., the Greek comic writers not only ridiculed her but made her out a courtesan. Thus it may readily be seen, by those who wish to learn, that another chapter in sexual pathology, perhaps the most quoted, has been destroyed by the ruthless hand of an investigator who, despite Krafft-Ebing and his many disciples, has that sort of bravery which impels work along new lines and a cleanly way of thinking that refuses to take cognizance of nastiness. And on similar lines we have a restitution of the moral attributes of the French writer, Restif de la Bretonne, after years of opprobrium because of the charge of fetishism. One passage from Dr. Barras' study should be cited if only to show the sanity of his mental processes: "He [Restif de la Bretonne] does not belong to pathology. His works are for the artist, hence should be analyzed with care by the medical critic. The latter must not forget that between normal and abnormal persons there are the intellectuals, the esthetes, the dilettanti: those whose nervous system is overdeveloped, one might say, and whose sensations are a surprise to commonplace people; hence are called morbid by them. These sensations no medicolegist or neurologist is able to explain."

What conclusions are we to draw from these two rehabilitations? Surely none other than that a brighter, a cleaner page is being written in medicine. We have been waiting for some time for this opportunity to record our rejoicing at the downfall of certain chapters in sexual pathology the fabric of which has always seemed to us to have the flimsiness that comes from idle thoughts, tittle-tattle unworthy of medical encouragement, and a pandering to that form of mentality which is enamored of the abnormal. Not that we are champions either of Sappho or Restif de la Bretonne, for we are merely taking the word of supposedly well-intentioned writers as to the moral status of either; but what we are

champions of is a severance from the sexual pathology obsession of recent years so that our obliquity will no longer make us thrust every man of genius into the mire of lowly criticism and every grocer's clerk into the supernal atmosphere of purity and moral cleanliness.

DOES THE ANGLO-SAXON BATHE TOO OFTEN?

Nowadays, what with our intense and unswerving interest in the preservation of the race or rather in that part of it which we think needs our many ministrations to prevent the slightest lapse into the ways of the careless, a new chapter has been written on the subject of when and how to bathe, the temperature of the water that may prolong life, and especially what soaps should be used and what soaps should be shunned. We take it this very interesting agitation got its cue from those weighty words of Sir Almroth Wright the gist of which was that frequent bathing was weakening, that the use of soap was a habit that had no virtues, in short, that by encouraging, or rather by overdoing the act of bathing, we were inviting all sorts of diseases to enter our pores, thus converting what otherwise would be stalwart men into those oafs whom Kipling lamented in one of his patriotic poems. Shortly after this remarkable pronouncement, Dr. W. Allan Jamieson's book entitled "Care of the Skin in Health" appeared, and again we were told that the English people are really in a state of ignorance on account of their persistence in using the bath. And now there lie before the writer of these lines two journals—*The Lancet* of September 6th and the *New York Medical Journal* of September 13th—in which considerable space is devoted to soap and the care of the skin. After reading both contributions carefully—the editorial in the English journal on Dr. Frederick Gardiner's article entitled "Soaps and Their Effect on the Skin" issued from the laboratory of the Royal College of Physicians of Edinburgh and Dr. Daisy Orleman Robinson's "Hygiene of the Skin" in the American journal—the thought that must arise in every intelligent reader's mind cannot be other than our own—namely, that although these authors are in favor of bathing and also are quite enthusiastic on the use of soap, there is such a divergence of opinion as to the sort of soap that is to be preferred so that the skin will remain unirritated, and there are views in general so diametrically opposed to those of Wright and Jamieson that perhaps to avoid controversy with one's own physician, not to mention various members of one's family who may have flirted with the dictum 'No baths, long life,' it were better after all to abandon all thought of keeping the body clean by complete immersion and a liberal amount of soap.

It does seem strange that after all these years of unintermitted advocacy

of the bath by the Anglo-Saxons—and the Americans are included in this category—and after what we have read on the subject of our physical supremacy, due to our cleanly habits, that a propaganda should be started to put very foolish ideas into the heads of the people at large. While it is undoubtedly true that domestic soaps that are used for the washing of clothes would hardly be the sort that one would advocate for the bath, to drag these into the controversy so as to show their bad effect on the skin when used in the bath is a very unnecessary procedure. If it is true that the poor must perforce use these for economic reasons, it is also true that the poor resemble a goodly proportion of rich in not using soap at all. Statistics of personal cleanliness will never be forthcoming, because he who would undertake this Herculean project would not survive for long, either physically or mentally; but lacking statistics can it be affirmed that the quantity of soap used by the average individual in his bath will ever subvert his health? That occupation dermatitis is observed often enough to give us pause, we are willing to admit; but just because this occurs is no reason for launching anathemas at all soaps, and even going so far as to asseverate that if their disuse is not insisted upon a nation will be made up only of weaklings.

But when we consider the bath minus soap, what have not been the opinions set forth to show the utter wickedness of those who plunge into very hot or cold water. And yet we know that the Japanese 'steam' every day in hot water and that instead of being physically decrepit they are a very sturdy race. But they are not the only nation that makes a cult of the hot bath, for if we are to believe what is stated in a recently published book—"Finlande et Finlandais" edited by Professor Werner Söderhjelm—another nation has been added to those who already see no harm in steaming themselves daily, who are not obsessed with an ineradicable fear that the open air, no matter what its temperature, is not the best means to dry the body after a douche of tepid water subsequent to the steaming, and who really believe that besides its cleansing properties their mode of bodily cleanliness has a therapeutic value. Steam baths are considered an invaluable remedy for a chill or fever, and in muscular stiffness and pain around the joints they have a beneficial purpose.

Whether or not we believe that the foregoing drastic measure should be advocated among all peoples, or that cold baths have virtues which hot baths can never possess, it is far better to preach the most advanced gospel of cleanliness than none at all. The person who bathes frequently is a cleaner person, both physically and mentally, than he who does not; and, if our desire is to-day to bring about a higher morale among the people at large, let us not cavil at a soap because forsooth it may be a little too strong in alkali or at large quantities of water even though applied to the body oftener than once a day. For let no one think for a moment that human nature is so smitten with the idea to keep clean that it will ever have a maddening desire to use too much soap or water.

OPINION AND CRITICISM.

TANGO.

No doubt by this time there is no doctor in these United States who has not heard of that very modern dance the Tango. Perhaps, had we written that at present there is no doctor who has not danced it, great would be the wrath of some correspondent. Now, although we are well informed as regards the statistical tables of disease, the fact, that until the moment of writing this editorial the Tango was considered a mild form of diversion and not a disease, must be held accountable for our lack of knowledge regarding the number of doctors who have so far forgotten their dignity and their hatred of anything pathological in their make-up that they dedicate their evenings to its many allurements. Fortunate it is that there may be some who have not succumbed, for if we are to draw the right inferences from the first faint whisperings of a somewhat medical nature as to what happens during the execution of this dance, it cannot be thought other than a very moral attitude on our part to warn those of the medical profession, who are weakening toward this dance, to crush any desire which may have arisen from seeing others indulging in what at first might be thought to be a lesson in physical culture!

Just why this dance should be considered not only immoral but a manifestation of a neurosis or hysteria, we are not yet in a scientific position to say; but if we pin our faith to what a non-medical man has to say on the subject—Sem, the talented cartoonist of the *Petit Journal* (Paris)—in an article entitled “Les Possédées” which appeared in *Æsculape* for June, it must be admitted that all its vaunted innocence is a thing of the past and that it rightfully belongs to that already lengthy chapter in neurology which takes up the neuroses. To quote: “Strange ball! No laughter, no conversation, not the slightest appearance of a fête. Nothing but music, mournful and agonizing, and the gliding of feet on the floor. These disconcerting evolutions, this tormenting quasi-immobility, bear no resemblance in transport, in physical sprightliness, in the ecstasy of movement to the usual dance. These serious people, who rub each other, who mutually knead each other, with such methodical and persistent application, are they practising abdominal massage? Is it a lesson in physical culture? Or would it not be better to say it is the means of creating a feeling of voluptuousness? Is it an innocent diversion or a vice? Are these people neurotics, exhibitionists, maniacs? In the presence of these mysterious and lascivious contortions, the spectator feels ill at ease, his nerves are distraught, a desire seizes him to laugh when he

thinks that what was formerly hidden from the public as regards the most private phase of physical love is now brusquely unveiled without any sense of shame; and he cannot put the thought aside that this impenetrable audacity is the sort that inspires the incomprehensible mimicry of the insane. Gazing at what to him is a manifestation that should be sacred, he feels himself an intruder, an interloper, a reprobate; and he wishes to escape from this room that has the atmosphere of an opium den, an insane asylum and of certain houses whose name is tabooed by respectable society."

And yet, despite the foregoing mordant criticism, we find that there are other critics who are less harsh, who in fact are so lenient in their attitude toward this dance as well as toward others which may be said to belong to the same eccentric terpsichorean family, that their written word should not be overlooked in any judgment indulged in by the biased or unbiased mind. For instance, in a number of *Collier's Weekly* of recent date, there an article in which the writer sets down the opinions of a physician in regard to one of his 'troublesome' patients, who found that she was growing fatter, let us say from week to week, though when the lay press writes impressively on this subject it never fails to say "from day to day." Now without boring the reading with all that this physician says philosophically and altruistically, it would be doing him a gross injustice not to quote the following excerpts which breathe his intense interest in his patient: "Being a physician, I am keen for anything that makes people healthy and fit. Instead of prescribing a trotting horse, I order turkey trotting. . . . I have a patient, a woman of about forty-five, whose great trial it was that she was fat and growing fatter. . . . Fashion had come to my assistance. 'Turkey trotting,' I advised. . . . I have been that woman's physician for years and I never saw her so well and so young. Naturally I believe in turkey trotting. There is nothing so moral as good health."

Here we have two views that are certainly not related even by the most distant ties. In fact, they are snarling at each other with an intensity that is the opposite of refinement. On the one hand, the layman of Gallic wit and Gallic perspicacity sees in the Tango nothing commendable—in which denunciatory attitude, by the way, he is supported by an English essayist, Mr. Filson Young, in a recent issue of the *Saturday Review* (London), though the Briton, it must be admitted, true to Anglo-Saxon reticence is denunciatory only on the subject of the lack of grace in the dance and the ridiculous attitudinizings of all persons, especially noticeable in those whose weight is above what it should be and whose years proclaim them no longer indiscreet, while on the other, we have the word of a physician, presumably in good standing, who advocates the dance for all those reasons which are generally pursued by all physicians when they wish to raise their patients out of the Slough of Despond, brought on by too great an accumulation of fat, and which has hitherto been unsuccessfully

combated with drugs. But we pause here to ask a pertinent question: Are not the times awry if so remarkable a happening can be chronicled as that of a modern physician becoming purblind in these days when part of his mission as a medical man should be frequent excursions into the social morasses of low morality so that the race may be improved, and a mere layman is usurping his usual position?

DEATH OF DR. JESSE S. MYER.

Dr. Jesse S. Myer died on October 29th, after a long illness, the sufferings and inconveniences of which he bore with strange fortitude and heroism. Few of his friends knew that he was stricken with a necessarily fatal disease, for he continued his work with his customary cheerfulness and energy. So when he passed away, the memory left behind was that of a vigorous, active personality in the fine flush of an approaching maturity of forty years. It is given to those who knew him best and who worked with him in hospital and clinic to indicate why his place will be hard to fill and how rare was his kind of activity.

A physician's life is ended; what is there to say of that evanescent struggle against sickness, disability and death? The story of his day's work is hidden from view in the written records of his patients, or in the impersonal notes on the history sheets of the clinic and hospital. The ever dimming memory of his kindness, firmness and wisdom lies in the hearts of the men and women whom he has helped, or tried to help, and that can never be recorded, or set down. There remains then the figure of the man and the published work he has left behind.

Dr. Myer's most important work—"The Life and Letters of William Beaumont"—was published in June of this year. It was finished when he knew that his term of life was to be short, and it was left as a precious heritage to those most dear to him. It is the definitive life of the great physiologist and is a lasting proof of its author's industry and enthusiasm.

Beaumont would have loved such a biographer, and the spirit which carried along his own researches into the physiology of the digestive system, so graphically told in Dr. Myer's pages, is the essence of the spirit which he himself gave so generously to the writing of it. Beaumont and Myer are thus linked together in the written records of the history of medicine, and both might well be satisfied with the play that fate has made with their careers.

In addition, Dr. Myer had written a number of clinical papers, dealing largely with the digestive system, around which his interest was largely centred. They reflect what was, perhaps, his chief characteristics as a physician—care, precision and conscientious study. Their permanent value in the ever-shifting viewpoint of internal medicine may be evanescent, but as an index of Dr. Myer's professional activity they are of value.

His connection with the JOURNAL dates from 1901, when he took charge of the Department of Internal Medicine. His book reviews, abstracts and collected articles covered a wide range of subjects and were written with the care and accuracy characteristic of the man.

How can a career hardly begun be summed up? Can a few words ever give the charm, flavor and vigor of a robust personality? To those of us who knew him best, Dr. Myer was the high type of internist, a term scarcely known before he came to St. Louis. To his patients, he was the wise, careful and frank adviser; to his friends, he was loyal, discreet and faithful, and to his few enemies, he was a fair, upstanding antagonist.

To all who knew him, he stood as the type of a high-minded physician, and nothing in his life was more redolent of the fine flavor of his personality than his defiance flung to the fatal disease that finally carried him off.

To minister to the needs of the sick, in the face of personal discomfort, to be outwardly cheerful, with the grip of an incurable malady upon one, to face successfully the daily problem of living within the shadow of the unsolved problem of death, these are, indeed, achievements which arouse a thrill of admiration and envy. All these things Dr. Myer did, and did each long day in the long two years which measured his struggle and his knowledge of the malady which had hold of him.

For him Henley's words are fitting:—

"So be my passing!
My task accomplish'd and the long day done,
My wages taken, and in my heart
Some late lark singing,
Let me be gather'd to the quiet west,
The sundown splendid and serene,
Death."

S. I. S.

ORIGINAL ARTICLES.

THE DIAGNOSIS AND TREATMENT OF INOPERABLE CANCER.*

By CONSTANTIN DANIEL, M. D., of Bucharest, Roumania,
Professor of Obstetrics, University of Bucharest.

With the exception of surgical methods, the cure of human cancer, by means of internal medication, was thought to be impossible. At the International Congress of Heidelberg in 1906, Czerny, after mentioning the work of such authorities as Mohr, Langger, and Orth, reported some indisputable cases of unexpected cure of cancer outside all medical intervention.

The recent researches of Wassermann concerning the use of the salts of selenium in the treatment of mouse cancer, and the encouraging results obtained by the new anticancerous medications, give us hope of the possibility of a clinical, and even of an anatomical, cure of certain inoperable cancers.

The recent work on the nature and treatment of cancer, which constitutes an important contribution to the modern therapy of malignant tumors, appears to the writer of enough interest for a résumé of the actual state of our present-day knowledge on the subject of the diagnosis and treatment of those cancers which are called inoperable, emphasizing in particular certain methods which seem to be capable of yielding a certain degree of amelioration and, exceptionally, a lasting cure.

DIAGNOSIS.

It has been demonstrated to-day, scientifically, that cancer is primarily a local disease. In spite of the propaganda conducted in favor of early intervention in cancer, the majority of patients who come to consult physicians are already inoperable from an anatomical point of view (extension of the cancerous processes), and also from a clinical point of view (general state of the patient). This is due, in great part, to the fact that cancer not being painful in the beginning, physicians have the opportunity to examine the growth only after it has caused divers grave functional disturbances (dull pain, hemorrhages, injury from compression). On the other hand, the diagnosis of extensive visceral cancers (stomach, intestine) is much more difficult to make in the very beginning.

The inference then is that almost half of the tumors which are sub-

*Translated by Dr. Philip Skrainka.

mitted for radical surgical operation are already inoperable, even when the operation is anatomically possible. When the operation is performed later on, the tumor has already effected histological changes in the neighboring tissues and in the lymphatics, and recurrences are more or less early. If we refer to the recent statistics of Wertheim (Vienna, 1911), we shall see that in cancer of the cervix of the uterus, operated by the abdominal route, there was 57.6 per cent. of definite cures (absence of postoperative recurrences during five years).

Therefore, it is of the greatest importance, since the chances of cure after an operation are much greater when the intervention is practised early, to know the essential points upon which to base the diagnosis of the operability of cancer.

A cancer is called inoperable when the total amputation (the primary seat and the secondary propagations) is beyond the means of modern operative therapy. Thanks to a considerable number of visceral cancers operated upon in recent years, we are in a position to outline by sight the degree of real extension of the lesions recognized at a clinical examination and to form a more precise idea as to the operability of neoplasms from the surgical standpoint. In making the diagnosis of the operability of cancer, besides the local and topographical state of the neoplasm, one must take into account the general condition and the organic resistance of the patient. In other words, to make the diagnosis of inoperable cancer, we must take into account (a) the extension of the neoplastic lesions, and (b) the degree of alteration in the organism of the patient and in his resistance to operation.

(a) The seat and the extent of the tumor, whether it is a matter of an accessible or a deep-seated cancer, the mobility of the invaded organ, the degree of propagation in the neighboring tissues, and, finally, the ganglionic propagations and the metastases, are the salient points which should enlist a most careful examination in case of cancer.

From the writer's experience in the matter of uterine cancer, the opinion which he has formed is that the limit bounding the operability of cancer has not been extended by modern researches, and that to-day one ought to consider inoperable all neoplasms which from a local point of view have extended beyond the limits of the site (organs or tissues) primarily invaded, and which are accompanied by secondary propagations in the vicinity and by more or less ganglionic disturbances. The metastases, developing at a distance in the large viscera and the tissues, indicate the generalization of cancer; they make our prognosis unfavorable and constitute a contraindication to all radical surgical attempts.

To sum up, the following cancers are inoperable from the point of view of operative technique: All extensive external neoplasms with rapid invasion of the ganglions; all deep-seated cancers, visceral and intra-abdominal, forming voluminous masses, irregular, accompanied by ascites which forms with rapidity and is excessive, icterus and yellow atrophy of the liver, and a grave pancreatic-biliary syndrome. Mechanical com-

plications of the intestine (intestinal occlusion), intense thoracic complications (invasion of the pleura and lungs, respiratory disturbances), and likewise cardiorenal complications make a postoperative prognosis grave.

In pelvic cancers, the spreading to the cellular tissue in the pelvis, to the bladder, rectum, vagina, necessitates such extensive resection that the operability of most of these neoplasms is very much restricted.

(b) Among the contraindications taken from the general phenomena occurring before the appearance of cancer, the general condition of the cancerous patient is an excellent indication as to whether the neoplasm is operable. The cachectic state (anemia, sallow discoloration of the integument, extreme wasting, edema), and most of the general symptoms which indicate the wasting of the organism and nervous exhaustion (fever with great oscillations, phlegmasia alba dolens) should interdict surgical intervention. Finally, the exacerbation of certain functional troubles (violent pains, considerable hemorrhages, intestinal occlusion, asphyxia), which according to clinical observations are symptoms belonging to a period that precedes the disease and the cancerous extension, constitute, in the same degree, obstacles to the performance of an extensive operation.

(c) There are certain causes of error which should be recognized so as not to consider inoperable a cancer perfectly limited and in the beginning of its evolution. Clinical observation alone of the degree of the local lesions and of the gravity of the general disturbances does not suffice to eliminate a priori all chances of the operability of a cancerous tumor. Thus, it is not necessary to consider inoperable every immobile cancer situated in infiltrated tissues and which adheres to the neighboring organs. Secondary ganglionic propagations at a distance (subclavicular adenitis in abdominal cancers) should no longer influence us to eliminate an early surgical intervention. In fact, the immobility of cancers opening outwardly (breast, uterus, stomach, intestine, rectum) is not always due to the secondary neoplastic propagations; often the perineoplastic adhesions are purely inflammatory. The volume of the tumor may seem considerable if one takes into consideration the invasion of the neighboring organs and the hardening of the perineoplastic tissues; but this clinical impression does not correspond to a veritable propagation of cancerous processes; it is often the consequence of inflammatory deposits, of pericancerous edema developing as a result of secondary infections—successive stages in cancerous ulceration. In this manner are explained the edematous and suppurative infiltrations that one sees sometimes in the course of an operation in the neighborhood of the cancer or in the perineoplastic lymphatic ganglions. The simple, inflammatory parametritis, which is seen in certain cancers of the cervix of the uterus and in phlegmons situated in the neighborhood of cancers of the digestive tract, may give the clinical impression of an extensive neoplastic invasion, and

constitute a contraindication to the operation. In these cases, many of the facts, which go to the making of a true diagnosis of the lesions, are established only in the course of an intervention that is completely radical. Finally, the voluminous adenopathies which accompany certain ulcerative cancers (uterus, rectum, breast), due to a commonplace secondary infection of the tumor, may cause errors in diagnosis by making us believe a tumor, with cancerous ganglionic propagations, inoperable, especially to-day when the extensive modern operation with the scooping out of the ganglions has precisely this point of operative technique.

The general symptoms of cancerous patients may in the same way give rise to errors in diagnosis. It is necessary to recognize the difference between the veritable toxic cancerous cachexia, which constitutes a formal contraindication to surgical intervention, and the various accidental general conditions, such as posthemorrhagic anemia, pain, fever, and hemorrhage due to the infectious lesions superadded to the tumor, which ought to be lessened or cured before a diagnosis as to inoperability is made.

Before determining the important question in regard to the diagnosis of inoperable cancers, the writer wishes to emphasize that the operability of deep cancers (intra-abdominal) can often be determined only by the sight and on palpation of the lesions in the course of the operation. Again, when there is the real difficulty of making an early diagnosis of certain inaccessible cancers, the writer is of the opinion of his teacher and friend, Professor Tuffier, of Paris, who says: "Every suspected cancer should be demonstrated, and this knowledge can be gained, in most instances, only at the price of an exploratory laparotomy, though this is less grave than not to recognize a cancer in the beginning." If, on the other hand, we are dealing with cancers of the uterus, of the stomach, or of the intestine, which appear, on local examination, to be at the borderland between operability and inoperability, and without some decided contraindication (cachexia, secondary propagations in the neighborhood, generalization), laparotomy should be done, and the diagnosis of inoperability should be made in these borderland cases only on direct view of the lesions.

Finally, even in those desperate cases of cancer recognized as being beyond operative resource, the physician ought not to feel that he is entirely disarmed against this terrible affliction and ought not to act indifferently while the lesions are progressing. If he has not the power to cure his patients, he can at least relieve them and prolong their existence by the aid of palliative treatment, local and general, which will now be described in detail.

TREATMENT.

If, as has been stated, surgical ablation is always the principal and best remedy for external and deep-seated cancers, clearly defined and in the beginning of their growth, it is not less true that the operation

is insufficient in very extensive tumors with secondary propagations or when there are recurrences from inoperable cancers. It is in the latter cases that the palliative non-operative treatment finds strong adjuvants in certain local remedies and in internal medication, which, though they do not cure, at least incontestably ameliorate certain forms of inoperable cancers and postoperative recurrences.

Our knowledge of the causes of cancer being the most obscure, we cannot at the present time combat this disease by rational etiological treatment. Be the pathological idea of cancer what it may, to establish the therapy of inoperable neoplasms, we are still dependent on our clinical knowledge, and on various external remedies and internal empirics which affect their growth directly or indirectly. Clinicians have essayed at all times to lessen the growth of neoplastic tissues by various local remedies (direct application or application made at some distance from the growth), or by general means (through the intermediary of the circulation).

Although the results of the methods of experimental treatment, up to the present, have not attained the hopes of the profession, it is important that the clinician should know thoroughly the action of all the palliative means, external and internal, which may cause a modification in the tumor and a general amelioration in the condition of cancerous patients.

To retard the fatal evolution of cancerous processes and to ameliorate the general condition of the patient, we ought, in principle, to combat locally the tumor by aiding the cellular processes of perineoplastic reaction, and in particular, the reaction of contiguous tissue against a cancerous evolution; and we ought, moreover, to strengthen generally the organism by reenforcing the humoral rôle of the economy so as to permit it to defend itself against the invasion of cancerous lesions.

The writer cannot here mention all the palliative procedures which have been advocated against cancer; this enumeration would have only historical interest. Nevertheless, he will make a choice of the methods which appear of some certainty on account of numerous and confirmative investigations.

I. LOCAL THERAPY.

In the chronological order of discovery, divers surgical, physical and chemical procedures have been extolled in inoperable cancerous tumors.

1. *Palliative Operations*.—Among the operative interventions capable of exercising a certain action on inoperable cancers, the writer would mention (a) the direct operations of amputation (partial ablation of the tumor, curettage); (b) the indirect operation without amputation 'at a distance' (arterial ligations causing atrophy, lymphatic stasis by ligation of the thoracic canal).

(a) Partial ablation of inoperable neoplasms (amputation of uterine and mammary cancers without extirpation of the ganglions) is not considered to-day a good measure to pursue. Incomplete extirpation is the course most often pursued when the surgeon is deceived by the ap-

pearance of an inoperable lesion. After an amelioration lasting some weeks, the lesion which seems to have been influenced by the operation terminates in a fatal evolution.

(b) Many times the writer has had recourse to curettage of inoperable uterine cancers, and the amelioration of the general state, as well as the modification of the local lesions, was most satisfactory. The palliative extirpation by the curette is indicated in certain vegetative cancers when there are successive hemorrhages, discharges and febrile infections which menace the life of the patient.

(c) The attempts at vascular ligation, called atrophic by Tuffier, on the nourishing arteries of inoperable cancers (hypogastric, uterine, lingual, carotid, splenic and renal arteries) in the hope of diminishing the vascular supply to the tumor, does not prevent the propagation of the cancer in spite of 'a semblance of amelioration' in the lesions during some weeks. Nevertheless, in certain hemorrhagic external cancers (tongue, uterus), this method can be of service in causing hemostasis.

(d) It has been thought that ligation of the thoracic canal would retard, by lymphatic stasis, the evolution of certain abdominal cancers; and Jianu, of Bucharest, in 1908, applied this procedure many times without observing a modification in the tumor.

2. *Chemical Agents*.—At all times, attempts have been made to cause (1) a partial destruction of the tumor by the aid of different caustics applied in a topical manner; and (2) a sclerogenous action by interstitial injections with the view of encircling the tumor in a fibrous ring and preventing its extension.

(a) Among the topica, that is to say, the medicines which we use as dressings in the hope of modifying the cancerous processes or causing the mortification of the cancerous cells, there are some chemical caustics which, though not of recent date, have a certain therapeutic value. They are applied in the form of stains or pastes to the surface of the tumor. The stains applied every two or three days are either arsenious acid in a 1 per cent. solution (Trunczek, Czerny), a 1 per cent. solution of chloride of gold (Czerny), a 5 per cent. solution chlorate of potash, or a 40 per cent. solution formol (Richelot). In extensive cancers, these cause local amelioration.

(b) The old-fashioned pastes that have a basis of chloride of zinc (Canquoin's paste), caustic potash (Vienna paste), if handled with care, have yielded some good results, especially in external cancers (face, breast). In the accessible cancers of the skin and mucous membranes, Zeller (August, 1913) used an arsenical paste* on the tumor and on its immediate environments, repeating the application every eight to fifteen days and continuing until the disappearance of the neoplasm. Zeller's re-

*Zeller incorporates the following ingredients in his paste:—

Arsenious acid.	2 grm.
Red sulphate of mercury.	6 grm.
Animal charcoal.	2 grm.

sults have been most encouraging. Of 57 tumors (skin, lips, cheeks, lids, vagina, cervix of the uterus, breasts, ganglionic metastases) accessible to the application of the paste, 44 remained cured for many months or years.

(c) The process of introducing into the tumor from five to six small fragments or small points of carbonate of calcium is very efficacious. By contact with the vaginal secretion, the carbonate of calcium gives forth an antiseptic gas, acetylene, which quiets the pain, coagulates the blood, arrests the hemorrhages, diminishes the odor, and by its residue of lime in excess forms a caustic.

(d) Interstitial injections made into the middle of the tumor or at the periphery result in a certain amelioration and diminish the volume of the tumor. Lutaud, of Paris, has obtained good results with absolute alcohol injected with a Pravaz syringe all around the diseased points, 1 c.cm. divided into five or six injections being made daily. Formol is an excellent preparation which modifies the cancerous tissues with surprising rapidity. It has been employed by Morestin, of Paris, 1912, in the dose of 1 c.cm. of a solution consisting of equal parts of 90 per cent. alcohol, glycerine and formol, in intratumoral injections, or by dropping it on the tumor for many days in succession. It is a coagulant and sclerotic, susceptible of acting on the cancerous tissues by imbibition; in the parts infiltrated by formol the neoplastic mass diminishes considerably and tends to cicatrize; and at the same time there has been observed a notable improvement in the general state with appreciable diminution of the suffering.

Some favorable results have been observed following the use of a 15 per cent. solution of acetic acid, or 0.2 gm. per 100 arsenious acid solution in injections of one to two Pravaz syringe fulls, at intervals of two to eight days (Hue, of Rouen). The perineoplastic sclerogenous injections of chloride of zinc have not yielded good results in the hands of Tuffier. Thinking that methylene-blue could have an elective action on the cellular body, attempts have been made, in some inoperable cancers (tongue, lips, pharynx, rectum), with interstitial injections of 2 c.cm. of a 5 per cent. solution, repeated after eight days, but the results have not been satisfactory.

3. *Physical Agents.*—Heat and cold, electricity (electrolysis, electrocoagulation), the high frequency current (fulguration), radiotherapy, and radium are the principal physical agents which have been employed to modify cancerous processes.

(a) The point of the thermocautery, maintained at a dull-red temperature, introduced in many places close together in the neoplasm and left in place from four to five seconds, causes, at the end of eight to fifteen days around each of the points and at a distance of 2 or 3 mm., a reaction in the fibrous tissue containing the neoplastic cells, by transforming the tumor into a fibrous lump. Hot air at a very high tem-

perature (400-500° C.) introduced into the tissues by means of different apparatus (Doyen, Quénu, Jayle), acts as a caustic on small cutaneous epitheliomas, and causes an eschar. The old-fashioned actual cautery (the cautery with Nélaton's gas), which burnt the cancer, caused a hard and dry eschar, and is still recommended, especially in hemorrhages and ichorous discharges from uterine cancers.

(b) Cold by means of chloride of ethyl was advocated in 1901 in the treatment of inoperable cancers by Howitz, of Copenhagen, who, by freezing for five minutes, has treated certain cancers of the uterus and vagina. This author has observed, at the end of some time, a healthy growth in the cancerous tissues. Bernstein, Nobl and Tuffier have treated cancer by means of carbon dioxide snow; after its application, from fifty to seventy seconds, on an ulcerated tumor or one covered with healthy skin, an eschar is produced which separates at the end of eight days and gives place to a soft cicatrix.

(c) Fulguration introduced as a therapeutic agent by Keating-Hart, after having enjoyed a certain degree of popularity, has been almost totally abandoned. The action of the high frequency current is comparable to a caustic that burns but slightly. Contrary to the results from the x -ray and radium, fulguration has no specific action on the cancerous cells, but acts superficially, especially on the adjacent tissue. Fulguration may, however, destroy the superficial cancer cells by causing an atrophy which imprisons them in the fibrous tissue.

(d) The attempts at treatment by radiotherapy have been very encouraging in visible neoplasms, and there are records of cure of certain cutaneous cancers, especially of the face and external genital organs. The action of the x -ray seems specific; it causes an elective necrosis of the neoplastic cells (Tuffier) without injuring the healthy tissue, but this action is very limited as to depth (2 mm.). It may also be stated that in inaccessible and inoperable cancers (visceral or deep), in spite of the x -ray causing a cicatrization of the ulcerated parts and disappearance of pains and hemorrhages, there is no real anatomic cure.

(e) *Radiumtherapy*.—The researches of Dominici and Tuffier, of Paris, in 1908, on the treatment of cancer by radium, have made evident two essential points: (1) The ultrapenetrating ray from radium has an elective action on the neoplastic cells and is effective at a depth of at least 2 cm.; (2) the radiation temporarily stops the development of the cancer by modifying the evolution of the cancer cells.

Though it is generally used conjointly with surgery in cases of operable cancer, so as to prevent recurrence, radium can be employed in a different way, that is as a palliative measure in inoperable cancers. The apparatus is placed on the surface of the tumor (face, skin) or in the natural cavities (vagina, uterus) or, finally, is implanted in the depth of the neoplastic tissues (breast, ganglions). In using the Dominici tubes, each containing 1.9 cgrm. of pure sulphate of radium, Tuffier has seen, after

one or two applications lasting from twelve to twenty-four hours, a retrogression of various inoperable cancers (breast, cervix of the uterus, rectum, ovary). This authority has also observed the disappearance of edemās from compression, cessation of suppuration, pains and hemorrhages. After many applications of radium, he has observed the local arrest of consecutive metastases in epithelioma of the ovaries and testicle. Recently Duval and Chéron (Paris, 1912) have published their report on an inoperable cancer of the cervix of the uterus which they treated by the ultrapenetrating rays of radium. By making two applications they obtained a clinical cure, confirmed at the end of fifteen months: "At autopsy the cancer appeared cured. It was of a special histological form."

II. GENERAL THERAPY.

The writer will not here emphasize the palliative therapy of various functional and general phenomena, and of the accidents and complications determined by inoperable cancers. The symptomatic treatment of the pains of compression in the vicinity of a growth, of hemorrhages, of infectious complications, of discharges, the reconstructive and moral treatment, and finally the various hygienic measures will be found described in detail in all the classical works on cancer. Under the heading of the general therapy of inoperable cancers, the writer will take up only the medical or internal treatment which acts through the circulation on the organism of the patients and which seems to have at the same time a certain elective or specific action on the neoplasm itself.

Internal medication seems to act in two ways—namely, either the treatment employed has really the power to diminish the size of the tumor and abate its virulence, or simply affects the general state by fortifying the organism and restoring to it a part of the power of immunization which has been lost.

1. *Organic Extracts*.—Opotherapy constitutes the final medical effort to attempt the prevention of the development of cancerous tumors towards a fatal issue. The experimental researches of Rohdenburg, Bulloch and Johnston with mice, and some recent observations, as yet quite limited in number, tend to prove that the ductless glands play a certain rôle in our fight against cancer, and consequently it was logical to introduce opotherapy (thymus, thyroid body) in the treatment of cancer.

Page, of Newcastle, Boll, of Glasgow, and Beaber have administered the thyroid gland in doses ranging from 0.3 to 1 grm., and claim to have obtained the arrest of certain cancers. Stuartlow, on the contrary, is a partisan of partial or total thyroidectomy. Fowleston uses both thyroid and thymus. Groger prefers the thymus, which in 16 inoperable cancers yielded a temporary amelioration in 13 cases. In the hands of Rohdenburg, Bulloch, and Johnston the extract of the thymus gland effected, when used for fifteen days, a cessation of pain with arrest in the development of the tumor and an amelioration of the general condition. Platon uses spermin and the extract of ovaries.

2. *Ferments*.—The treatment of cancer by therapeutic ferments dates from the year 1902, when Beard started the use of them in England, though this method is somewhat abandoned to-day. Beard thought that cancer was due to the transformation of embryonic cells which escaped destruction and persisted in the organism; hence, according to him, an attempt should be made to arrest the development of the cancer by giving the organism the pancreatic ferments which it lacks. In Germany, von Leyden, Bergell, and Blumenthal studied the specificity of the cancer cell, and showed that the cancer tissues were more easily digested by the pancreatic ferment (trypsin) than were the normal tissues; and they have administered pancreatin by the mouth in doses from 10-15 gm. per day.

In 1908, Tuffier and Mauté, of Paris, attempted to modify inoperable cancers (secondary epitheliomas of the neck, superficial cancerous metastases), by injecting into the interior of a tumor hepatic ferments, according to the procedure of von Leyden and Bergell, but the results were not satisfactory. Other authors have injected papain, amylopsin (Hald) into tumors, with mediocre results.

3. *Serums and Venoms*.—The attempts at immunization against cancer have not given any positive results in human therapy. By comparison with the procedures employed for the study of contagious diseases, the therapeutic attempts at anticancerous immunization (serotherapy, vaccinotherapy), and the researches on behalf of a specific medication have remained unsuccessful.

The anticancerous serums of Richet and Héricourt, of Paris, in 1897, Wlaeff, Adamkiewicz, of Vienna, and Borrel, of Paris, in 1907, the auto-serotherapy of Tuffier and Mauté by injecting under the skin of the cancerous patient the fluid from a cancerous pleurisy, and finally, the vaccinotherapy by the autoinjection of the fluid extract of the macerated neoplasm, have yielded some rare results, which give us hope that in the future the results will be better. In the majority of cases the methods of immunization against cancer cause only a temporary amelioration, due probably to a passing leucocytosis (Tuffier) which follows the injection.

Another method, based to the same degree on humoral reactions, which may be included in the group of toxitherapy, is the subcutaneous injection of 1/40 mgrm. of venom from the cobra-de-capello (Répin), in increasing doses. In a few cases there was some amelioration in the general state of the cancerous patients.

Finally, Fehleisen, influenced by the fact that for some time it has been known that patients with cancer were cured when they were attacked with erysipelas, attempted a therapy based on the inoculation of cancerous patients with erysipelas, without any satisfactory results. At the same time, Coley, of New York, conceived the idea of employing streptococcic toxins mixed with the *B. prodigiosus*, and it appears that he has had 16 successful cases out of 148 cases of various cancers.

4. *Medicinal Products*.—Finally, the writer will take up the principal chemical substances which have been the object of attempts at cure in cases of inoperable cancers: Quinine, arsenic, oxidized substances, silica, selenium and colloidal copper.

(a) Quinine has been employed in intramuscular injections in the form of neutral bichlorhydrate, in doses of 0.50 gm. per day for two to three months (Le Roy). Jaboulay, of Lyons, gives it daily by the mouth in cachets of 1 gm., with an intermission of two days every week.* The treatment by quinine appears to give good results. It produces considerable amelioration, characterized by a diminution in the ulceration and decrease in the fetid discharges.

(b) Arsenic in hyperdermic injections in the form of cacodylate of soda, in daily doses of 0.05 gm., increased progressively up to 0.75 gm. per day, and repeated every fortnight during seven months, caused, in a case of inoperable cancer of the breast observed by Mercier, of Paris, in 1901, cicatrization of the ulceration, disappearance of the ganglions and general amelioration.

(c) Among the preparations that have a basis of chlorine, Becker, of London, in 1908, recommended the hypochlorites in subcutaneous injections, and Barbarin, of Paris, in 1909, gave the preference to chlorate of magnesia in doses from 2 to 3 gm. per day, continued for a long time.

(d) Recently, in the cure of cancer, oxidized substances, which cause oxidations without affecting the normal tissue, have attracted some attention. Francis, in January, 1913, stated that he had cured, in 1907, a scirrhus of the right breast, and in 1912 a vulval cancer with secondary adenopathy by the aid of alkaline salts.**

(e) Zeller recently (August, 1912) advocated the internal use of the silicates in doses from 0.25 to 0.50 gm., three times a day.† This treatment which created some stir in German scientific circles seems to influence small circumscribed cancers favorably and also ganglionic metastases, increases the appetite, and, according to Zeller, even effects a cure.

(f) Following the researches of Wassermann, recourse was had to

*Robin, of Paris, injects quinine intramuscularly in doses of .05 gm., morning and evening, for eight days; then during the following eight days he prescribes two cachets, each of .06 gm., morning and evening. This treatment is continued during many months.

**Francis' formula:—

R Chloride of sodium.....	2	gm.
Sulphate of potassium.....	0.07	gm.
Sulphate of sodium.....	0.063	gm.
Phosphate of lime.....	0.075	gm.
Phosphate of magnesium.....	0.055	gm.
Hemoglobin.....	3.25	gm.
Distilled water.....	250.00	c.cm.

This dose is given by the mouth, one hour after eating.

†Zeller's powder:—

R Silicate of potassium.....	
Silicate of sodium.....	ana 20 gm.
Sugar of milk.....	60 gm.

In cachets of 0.25 gm. in a small quantity of sweetened water, to be continued for a year.

selenium and its derivatives, and in many quarters there were published observations of ameliorated cancers and even cures by this medication. Laurent and Bohec, of Havre, in 1912, published an observation of a neoplasm of the stomach in which Selenium A. Colloidal Electric, in ten injections of 3 c.cm., proved to be efficacious. The writer, in 1913, in 3 cases of recurrent uterine cancer which occurred at the end of from six to twelve months, by injecting 3 c.cm. of electro-selenium, every eight days, during three or four months, obtained the following clinical results which were truly encouraging: Disappearance of the fetid secretion, pains, and hemorrhages; renewal of the appetite, increase in the vital forces, and an undoubted improvement in the general condition. Locally, the tumor became harder, and all proliferation seemed for a time to be arrested. Cade and Girard, of Lyons, in 1912, administered colloidal selenium, intramuscularly and intravenously, in doses of 5 c.cm. (0.005 gm. in 5 c.cm. of isotonic serum), repeated every three days in a series of from ten to twenty injections.

In inoperable cancers—tumors, visible and palpable (cancers of the uterus, of the pharynx, with secondary cervical adenopathies, neoplasms of the digestive tube, cancroïds of the face), and in the very decided recurrences, seleniol causes improvement, both local and general. What is noted is drying with mobilization and diminution in the volume of the tumor and in the secondary adenopathies (Gascuel, Thiroloix), a diminution in the pain, the disappearance of secretions and discharges, the increase in the appetite, and, finally, improvement in the general condition, increase in the vital forces, and a return of sleep.

The favorable action of electro-selenium on cancers seems to be due, as has been shown by the biological studies of Henri, Duhamel, Robière and Juillard, to its power to fasten itself in the tissues of the healthy animal and in the elements of the blood, and above all, to influence the new formations (Wassermann).

The extremely interesting observations of Girard, of Lyons, Blumenthal, of Brussels, Bougeant and Galliot, of Paris, Trinkler, of Kharkoff, and the writer agree on one point—namely, the incontestable action of selenium on cancers. Electro-selenium constitutes a preventive in operable cancer as well as a strong palliative in those inoperable neoplasms which have not been treated surgically. Prior to the operation, electro-selenium cleanses and loosens the lesions; after operation, it may prevent recurrences. In inoperable cancers, selenium is a decided indication, especially in the deep tumors which cannot be approached by any other palliative methods.

(g) The recent experimental researches of the American writers, Leo Loeb, Fleisher, Leighton, and Ishii, of St. Louis, on tumors of mice, and the remarkable results obtained in man by Loeb, Lyon, McClurg and Sweek, of St. Louis, with preparations of colloidal copper in intravenous injections, give us further hope in the internal treatment of

inoperable cancers. These authors, by daily injections by the venous route of from 300-400 c.cm. of a colloidal copper solution, during a period of many consecutive weeks, have noticed that the general health (appetite, general appearance) is progressively improved, and after fifty injections, there is a gradual necrosis with resorption and retrogression in the majority of inoperable cancers (recurring carcinoma of the face, of the breast, of the upper jaw, of the nose). Microscopically, there was found an active proliferation in the perineoplastic contiguous tissue. Cancers with rapid and extensive metastases, in which the cachexia is pronounced, are not benefited by this treatment.

CONCLUSIONS.

From what precedes, the following conclusions may be drawn:—

1. A cancer is said to be inoperable when the total ablation of the primary seat and the second propagations are beyond the resources of any modern operative measure. The indications of the operability in general are the local state or condition of the tumor and its secondary extension, the gravity of the general symptoms and the organic resistance of the patient.

2. The limits of operability have not been extended by modern researches, and it is the opinion to-day that for every neoplasm which, from a local point of view, has passed beyond the boundary of the primarily invaded site and is accompanied by extensive secondary propagations, or where there is a general cancerous condition, surgical intervention should be formally interdicted.

3. When a cancer, upon local examination, seems at the limit of operability, laparotomy should be performed, since the possibility of a radical ablation of the tumor can be established only by direct examination of the lesion.

4. There is no specific treatment in existence to-day against cancers. Surgical ablation, extensive and performed early, is still the best treatment for circumscribed neoplasms. To prevent recurrences and metastases, the operation should be completed by a series of auxiliary methods (radiumtherapy, x -ray), and internal anticancerous medication.

5. In the present state of our knowledge, as regards the treatment of cancer, we can affirm that in inoperable and hopeless tumors, one should use the complete series of anticancerous therapeutic methods (local application of radium, x -ray, chemical agents; medicinal and specific internal treatment). These may cause the retrogression of the cancerous processes and even cure some cases.

6. Recent observations have demonstrated that a local or general therapy, which is well conducted, can retard the anatomical evolution of the lesion, and render, to inoperable cancers, a service which is considerable. By divers appropriate methods and by a symptomatic treatment directed against pain, hemorrhages and cachexia, the existence of

patients is made more bearable; many are hopeful again, and some even experience a feeling of well-being.

7. Among the many therapeutic measures which have been employed in inoperable tumors, each has its advantages and disadvantages and cannot be applied indiscriminately to all forms of neoplasms. Hence, there is no special method that can be recommended to the exclusion of others, but there are many forms of treatment which ought to be combined while attending the same patient.

8. Early radiotherapy is about the most efficacious of all local treatment (x-ray, heat, electricity, chemical caustics) proposed against cancer. It effects real cures and may be employed especially in very extensive cancers with slow metastases, and in postoperative recurrences. As to chemical agents, the majority of them cause a temporary retardation in the evolution of the lesions, without any permanent results.

9. Inoperable cancers may be benefited, to a great degree, by internal medication. Of all the recent forms of treatment which have been advocated, silica and selenium, by their results and by their simple mode of administration, constitute two remedies which render real service in the general therapy of inoperable cancers. Associated with the surgical and physiotherapeutic treatment, they may prevent or retard recurrences and metastases.

BIBLIOGRAPHY

- ¹ Blumenthal: Intravenous Injection of Electric Colloidal Selenium in Carcinomatous Cases. (*Journ. Méd. de Bruxelles*, August 8th, 1912.)
- ² Bougeant: Comparative Results in the Use of Selenium in Human and Animal Cancers. (1st International Congress of Comparative Pathology, Paris, October 17th, 1912.)
- ³ Castaigne and Gouraud: The Medical Treatment of Cancer. (*Journ. Méd. Français*, No. 7, July, 1911.)
- ⁴ Francis (*Medical Record*, January 18th, 1913).
- ⁵ Daniel: Diagnosis and Treatment of Inoperable Uterine Cancers. (*Bull. Société des Sciences médicales de Bucarest*, February, 1913.)
- ⁶ Girard: A Contribution to the Study of the Treatment of Cancer with Selenium. (*Thèse de Lyon*, 1912.)
- ⁷ Laurent and Bohec (*Province Médicale*, September 28th, 1912).
- ⁸ Loeb, McClurg and Sweek: The Treatment of Human Cancer with Intravenous Injections of Colloidal Copper. (*Interstate Med. Journ.*, Vol. XIX, p. 1015, December, 1912.)
- ⁹ Loeb, Lyon, McClurg and Sweek: Further Observations on the Treatment of Human Cancer with Intravenous Injections of Colloidal Copper. (*Interstate Med. Journ.*, Vol. XX, p. 5, January, 1913.)
- ¹⁰ Loeb, Fleisher, Leighton and Ishii: The Influence of Intravenous Injections of various Colloidal Copper Preparations Upon Tumors in Mice. (*Interstate Med. Journ.*, Vol. XX, p. 16, January, 1913.)
- ¹¹ Duval and Chéron: Uterine Cancer Treated with Radium. (*Bull. Société Médicale des Hôpitaux de Paris*, October, 1912.)
- ¹² Récamier: Traitement du cancer de l'utérus inopérable. Paris, 1905.
- ¹³ Szecsi: The Chemotherapy of Cancer. (1st International Congress of Comparative Pathology, Paris, October 17th, 1912.)

- 14 Thomas: Diagnostic et Traitement du Cancers Inopérables. Paris, 1913.
- 15 Tuffier: Traitement du Cancer Inopérable. Paris. 1912.
- 16 Tuffier and Mauté: Immunization Against Cancer. (*Journ. Méd. Français*, No. 7, July 25th, 1911.)
- 17 Wertheim: Die erweiterte abdominale Operation bei Carcinoma Colli Uteri. Vienna. 1911.
- 18 Wickham: Le Radium dans le traitement du cancer. Paris. 1913.
- 19 Zeller: Traitement et guérison des cancers par des moyens médicamenteux employés "intus" et "extra."
- 20 Zimmern and Cottenot: Treatment of Cancer by Physical Agents. (*Journ. méd. français*, No. 7, p. 450, 1911.)

THE CONTINUOUS CURRENT OF ELECTRICITY AS AN IMPORTANT FACTOR IN THE TREATMENT OF DISEASE.*

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The rapid development of apparatus for the production of currents of high potential and of high frequency, together with the great interest manifested in these currents, has had a tendency to render somewhat obscure, but has by no means vitiated, the great values of the continuous current in its many applications to therapeutics. It is true that the successful application of the continuous current to the diseased human body must be associated with a knowledge of certain laws that govern the action of the currents when passing through an electrolyte—especially a compound electrolyte such as we find in the body tissues and fluids. Certain laws of conduction and resistance should be understood by one using any form of current.

An earnest and careful study of the continuous current and its application to therapeutic use will easily justify the time and patience necessary to acquire a knowledge of its superior qualities.

The writer does not wish to discredit the good that has been and that can and will still be done by other modalities, but after an experience of thirty years with all forms of apparatus and all kinds of currents, if it should become necessary for him to confine himself to the use of one and only one modality and one battery, he would without the least hesitation select a portable battery of the continuous current type with not less than thirty cells of the bichromate variety, because he is sure that if the continuous current and its therapeutic applications are well understood, one will be able to treat successfully a greater variety of acute and chronic diseases than by any or all other modalities.

The red acid fluid battery, or what is known as the bichromate battery, gives a greater amount of voltage than others, and the cells may be small and easily transported. The writer would select a portable battery because it is equally useful in the office and at the bedside. He would select the continuous current because

1. The laws governing it are well understood, fixed and invariable.
2. It is a current whose flow is continuous and direct.
3. It is a current whose electrolytic law is fixed and definite with decided and opposite chemical action at the two poles.
4. It is a current normal to the animal tissues.

*Read before the Medical Society of Northern Virginia and the District of Columbia, at Warrenton, Va., May 21st, 1913.

5. It is a current whose flow from a portable battery is just as efficient and probably more so than from the most elaborate wall cabinet.

6. It is a current subject to many modifications of application of therapeutic value.

7. It is a current with well-established laws for causing reaction in normal nerve and muscle, and lastly,

8. It is a current with equally well-established laws for the reaction of degeneration in muscle and nerve.

Therefore, it is a current that has proved invaluable in diagnosis in determining the condition and degree of degeneration in certain organic and functional nervous diseases. It is a current that some neurologists have been compelled to use in making a diagnosis, who have condemned in wholesale the use of electricity in any form as a therapeutic remedy. A neurologist should be a scientist, and a scientist will not condemn anything as a scientific proposition that he does not understand, but will investigate. If the neurologist or the scientist investigates electricity in its connection with the animal tissues, he will find that every vital action is preceded, accompanied, or followed by currents of electricity. Every disturbance of molecular equilibrium in the minutest cell is associated with electric currents. With every chemical change in anabolism and catabolism we have electric currents of opposite signs. Therefore, in the process of metabolism, we have continuous current ions, both in the crystalloids and colloids bringing and carrying the elements necessary to nutrition, neutralizing and precipitating that which is unnecessary to nutrition and which must be carried away as effete material. The ionic action of the continuous current not only exists in the animal body, but is absolutely necessary to its existence. These are not fanciful theories, but have been shown to be true over and over again by the experiments of Matteucci, Du Bois Reymond, Brown-Sequard, Sanderson, Bose and others, upon animals and plants, after the most carefully conducted experiments with very delicately constructed instruments. Their experiments have shown that these currents always exist in the tissues, that they are always at work, that they are measureable, and that they are continuous or are what was formerly known as galvanic currents. Whether these tissue currents are synonymous with nerve impulses, we are not prepared to say, but it has been clearly shown that with every nerve or muscle excitation are associated electric currents of positive and of negative variation, that is, a current passing in the direction of the nerve impulse followed by a current flowing in the opposite direction. Within the last few years these normal tissue electrical currents have proved to be quite important factors in diagnosis. By the aid of the Einthoven electrocardiogram the condition of the heart muscle is pretty clearly defined. It has shown that in diseases of the heart this current varies, and gives its record-writing that shows very clearly the variation from the normal muscle currents. That these normal tissue currents are galvanic currents is proved

by the fact that Du Bois Reymond succeeded in measuring them through a specially constructed electro-magnetic galvanometer, and that through the delicate milliamperemeter constructed by a column of mercury, they produce phoretic action upon the mercury column, showing that a current is flowing and in which direction it is flowing. These facts, as well as many results obtained in the therapeutic application of the continuous current obtained from a battery of cells, lead to the conclusion that the tissue currents and the currents produced by chemical action in the battery cells are one and the same. Hence, the continuous current is a current normal to the animal tissues.

Not only in theory, but in actual practice, its tonic effect upon degenerate muscle and nerve is more marked and more certain than that of any modality known to-day.

The natural strain of tissue under the influence of agents that produce disease is in the direction of repair. If these tissues can receive, at the proper time, the aid necessary to their increased activity, and just sufficient for that aid, they are placed in the best position to overcome the ravages of toxic influences and to resume their normal function. This aid can frequently be rendered by the general application of the continuous current when it is applied in a way to tone, but not to over-stimulate, the nerve centres, glands or muscles, as the case may be.

This is especially true of functional and indeed sometimes of organic disturbances of the nervous system. The pain of neuritis may frequently be soothed by the mild application of the continuous current, the positive pole being applied to the seat of pain while the negative is applied over the spinal centre of the nerve involved. The high potential currents in these cases frequently intensify the pain and increase the inflammation. The stimulating influence of the continuous current upon the pneumogastric nerves, applied to them as they pass down through the front and side of the neck, will quickly show its effect upon the tumultuous action of the heart in cases of hyperthyroidism and other toxic conditions which seem to hold in check the inhibitory influences of these nerves upon the heart. In the treatment of exophthalmic goitre, the writer has been able to give marked relief to patients, suffering with intense tachycardia, by applying two negative electrodes, one over each pneumogastric, while a positive electrode was applied in such a way as to cover the sixth and seventh cervical and first dorsal vertebræ. If you will recall the wide distribution and functions of the pneumogastric nerves, you will readily see the therapeutic possibilities that lie before you in the careful stimulation of these nerves, when the indications are suitable. They are the motor nerves of the stomach and to a degree of the small intestines, and are supposed to influence the glycogenic function of the liver. The pancreas, spleen and kidneys receive branches from these nerves. In fact, the autonomic nerve system seems to be more or less under the control, motor or sensory, of the pneumogastric nerves. They are also trophic

nerves of the heart and lungs. The many functions that these nerves perform may be gently stimulated by a careful application of the direct current. The effect of this current is more perceptible, but no less marked, when applied to the cerebrospinal nervous system. It is the current of all currents best adapted to the treatment of atrophic and atonic conditions of the nerves and muscles.

By virtue of its decided polar and chemic action it seems to be applicable both to the motor and sensory system of nerves as well as to the nerves of special sense. The normal muscle and nerve reaction is first to negative closure contraction. The normal sensory reaction, as well as the reaction of the special senses, is to the positive closure. These are simple rules that anyone may test, and if found to be true, as the writer has found them to be, it becomes a matter of work and study to know the best application for the continuous current.

It was shown by Faraday, about one hundred years ago, that the electrolytic action of this current is proportional to its strength, its density, and to the length of time that it is flowing through an electrolyte; that the amount of chemical action is equal at all points of the circuit; that the anions or those ions carrying oxygen, chlorine, iodine, etc., are attracted to the positive pole, while the kathions or the ions carrying the metals and hydrogen are attracted to the negative pole. These are very important facts to remember when we wish to employ the phoretic properties of the continuous current for driving medicines in solution into the tissues.

The chemical formula of the salt must be known in order that we may know which pole will drive into the tissue the required radicals. Again, the negative pole is called the alkaline pole and has decided solvent properties. The positive pole is called the acid pole, and has decided astringent properties.

Massey, of Philadelphia, utilizes the electrolytic and cataphoric action of the continuous current for the destruction of malignant growths by zinc-mercury cataphoresis. Massey now designates these operations as 'ionic surgery.' The negative needle is the one which should be used for the destruction of small growths, such as moles and warts, and for epilation, while the positive needle or needles are best used in the destruction of vascular birth-marks.

Pauli, in his work on physical chemistry, states that all negative ions have irritating properties. If this be true, the suitable application of the positive pole to the seat of pain in neuritis or neuralgia should cause, under favorable circumstances, neutralization of the negative electrons which may gather at these points as the result of tissue polarization. This is mere speculation, but the fact still remains that the positive application of the continuous current does relieve neuralgic and neuritic pains in a very large proportion of cases. When the current is carefully and properly administered it is often curative.

For the cure of ovarian neuralgia, for dissolving pelvic adhesions, and for a general tonic effect upon the pelvic viscera, there is nothing, in the writer's opinion, that equals the continuous current when it is carefully administered to suit each case.

Space forbids the taking up of each condition in which the continuous current should be the current selected and outlining the treatment in these cases. The subject of treatment alone, by the continuous current, if carefully chronicled, would make quite a good-sized book.

If the writer has emphasized the fact that the continuous current (though neglected by many of the older men that are using electricity as a therapeutic agent and by nearly, if not quite all, of the younger men) is the current of all currents most beneficial, and best adapted to the greater number of diseases, and diseased conditions that we are called upon to treat, his object at this time is accomplished. When the pendulum of popular favor swings again into place (it is already beginning to recede), the new popular currents of high potential and high frequency, as well as the currents of low potential and high frequency, will find their useful level, but will in no way vitiate the usefulness of the continuous current which must resume its prestige after having been our tried and faithful servant for so many years.

1913 Eye St. NW.

SPONTANEOUS FRACTURE AND BONE CYSTS.

By A. C. BURNHAM, M. D., of New York.

Malgaigne in his treatise on fracture in 1847 recognizes the condition known as spontaneous or pathological fracture and gives a prominent part in its etiology to tumors of bone, both benign and malignant. As a complication of a cancer, primary elsewhere, with secondary growth in the long bone, fracture has been frequently noted; but it was not until the advent of the *x*-ray that a study of some of the earlier stages of tumor of the bone was made possible. Virchow, in 1876, reported a bone cyst, discovered at autopsy in a case of sarcomatosis, which he concluded was due to the degeneration of a cartilaginous inclusion in the bone substance. Mueller, in 1906, collected 50 cases of bone cysts, which occurred in children and young adults, and involved the bones usually involved by sarcoma, especially the femur, humerus and tibia.

The etiology of bone cyst is still obscure, there being a distinct type of localized bone cyst apparently not due to any pre-existing disease of bone (such as osteomyelitis, osteitis deformans, osteomalacia, etc.) which may occur spontaneously, and in which the first symptom may be fracture of the affected bone. Simmons has reported in detail 3 cases of spontaneous fracture in which the diagnosis of bone cyst was made by *x*-ray, which recovered after curettage of the cyst cavity and fixation for a little longer period than after the ordinary fracture.

The following case has so many points of resemblance to the benign bone cyst that the writer has been led to report it in detail:—

J. F., *et. forty-seven*, policeman; always healthy; has used alcohol steadily in moderation for the last twenty-five years, and does not remember any serious illness. In March, 1908, patient fell in street and was unable to use right leg. Was brought to the Presbyterian Hospital and admitted to the service of Dr. Ellsworth Eliot, Jr. Examination showed a heavily built, well-nourished man, appearing slightly younger than age given. His bones were large, muscular development good, and he did not look ill. The right leg was swollen around the ankle, very tender, and showed both crepitus and false point of motion. No tumor could be made out. A confirmatory *x*-ray was taken as routine and showed a degenerative condition in the lower third of the right tibia associated with fracture (Fig. 1). At the time, this was diagnosed as sarcoma and operation was advised. The patient refused operation, however, and went home to be treated by a private physician.

After leaving the Presbyterian Hospital, fracture was treated with cast for six weeks. After two months patient was able to walk freely, except that there was a slight pain after walking any distance. During this time patient lost considerable weight. On March 19th, 1909, while walking, right leg suddenly weakened and patient was not able to walk. November, 1909, was treated

at Bellevue Hospital for a time. At this time there was a tumor of leg, section of which showed giant-cell sarcoma. In January, 1910, he went to St. Luke's Hospital, where he was treated with radium for six weeks, without any apparent benefit. On February 24th, 1910, he was transferred to Bellevue Hospital, and admitted to the service of Dr. G. D. Stewart. During the period between the two admissions to Bellevue Hospital, the tumor increased to almost twice the original size and patient lost 30 lb. in weight.

Examination of lesion, on February 26th, 1910, showed an oval swelling on inner side of right leg extending from just below ankle-joint upward for about 4 inches. Tumor is hard, does not pit on pressure, and is quite tender. Motion of ankle slightly limited by swelling and pain. On admission to hospital, patient was running an intermittent temperature, at times as high as 103° F. This continued up to time of, and for some time after, operation.

Operation, March 5th, 1910. Steven-Smith amputation of right leg at knee-joint, under stavaine anesthesia.

Pathological Report.—Section of tumor shows giant-cell sarcoma, osteoid in character (Norris).

Following operation there was a staphylococcus infection of the stump which healed by granulation. On discharge, July 4th, 1910, general condition was excellent, patient had gained in weight and there was no pain in stump or elsewhere. Stump was entirely healed and inguinal glands were palpable, but not tender or inflamed.

April 10th, 1913, patient reports his general condition as excellent with no sign of local or general recurrence.

The radiographs show distinctly the cyst cavity in the lower end of the radius, with the fracture through the weakened portion of the bone. These radiographs were taken in 1908 when fracture occurred. At that time there was nothing in the history or the examination, other than the x-ray findings, to indicate that the patient had more than a simple fracture.

Bloodgood has collected 89 cases of bone cysts in which 4 cases were due to giant-cell sarcoma. He divides bone cysts into two groups: (a) The true bone cysts, which have a definite relation to osteitis fibrosa (69 cases), and (b) cysts in the medullary cavity due to other conditions (20 cases), such as enchondroma, myoma, giant-cell sarcoma, arthritis deformans, etc. In 19 cases of medullary sarcoma observed by Bloodgood, cysts were found in but 2, and he includes only 4 cases in his series of 89 cases of bone cysts.

The radiograph of the present case shows what is apparently a cyst of the lower third of the tibia. There was no incision made, and it is possible that the tumor was a solid tumor rather than a cystic one. The shadows of a medullary sarcoma and benign bone cyst are very similar in appearance.

Benign bone cyst is a disease of younger individuals. Ropke has reported 33 cases of cysts of the long bones, in 5 of which the patients were over twenty; one was over fifty. Bloodgood states that medullary sarcoma rarely occurs before twenty years and may occur as late as the sixty-sixth year. However, it may occur at any age.

In benign bone cyst, fracture is the most common symptom which draws attention to disease in the bone. Thus in 14 cases of less than six months'



Fig. 1.



Fig. 2.

Fig. 1.—Lateral view of lower extremity of tibia and fibula taken in 1908, showing early stage of giant-cell sarcoma and pathological fracture.

Fig. 2.—Anterior view taken on the same date as Fig. 1.

duration, reported by Bloodgood, the first symptom of the cyst was a spontaneous fracture of the bone involved. Simmons reports 3 cases in which fracture was the first symptom, and Lecène and Lenormant, Mueller, Ropke, and others have called attention to the frequency of fracture as an early symptom of benign bone cyst.

In giant-cell sarcoma, on the other hand, spontaneous fracture must be extremely rare, especially as an early symptom. Bloodgood states that in his experience pathological fracture has not been observed in giant-cell sarcoma. Fracture is usually a late complication of sarcoma and occurs only after the pain and swelling have been present for some months. In the above case, fracture was the first symptom, and it was only by means of the x -ray that a diagnosis was possible. Moreover, the appearance of the bone under the x -ray was suggestive if not identical with that of benign bone cyst, and the subsequent course of pathological fracture was the same as that occurring with the benign lesion.

Bloodgood, in the discussion of the use of the x -ray in the diagnosis of giant-cell sarcoma, says in part: "In my experience, in the fully developed bone cyst or giant-cell sarcoma, one would be able to exclude any other medullary lesion, except the myeloma when occurring as a single lesion, but I can imagine that in the early stage of the more malignant medullary sarcoma the shadow could not be differentiated from that of cyst or giant-cell sarcoma. For this reason the ultimate diagnosis must rest until the exploratory incision is made."

In the case under consideration, it was only after more than a year had elapsed that the tumor became evident and, through an exploratory incision, the diagnosis made absolute; and it was nearly two years before the leg was finally amputated. Although x -ray examination was not made in March, 1909, it is probable that on that date a second fracture occurred.

The prevailing plan of treatment of bone cyst, including the medullary type of giant-cell sarcoma is, if seen in the early stages, conservative. Bloodgood pointed out in 1903 that most of these cases get well after incision and curettage, even when there has been considerable destruction of bone, and in cases where the tumor has broken through the bony shell. Coley, on the contrary, believes that giant-cell sarcomata can and do cause metastasis, and that in many cases, resection and amputation are indicated. In the present case the tumor was present and active, was subjected to repeated traumata, was incised on several occasions and yet no metastasis occurred, and the patient is well three years after amputation. This would indicate that in this case the tendency to metastasis must have been very slight and that the disease, though progressive, was well localized.

In the report and discussion of this case the writer wishes to emphasize the following:—

1. The resemblance of certain cases of giant-cell sarcomata to benign bone cyst, both in the early symptoms and in the radiograph of the early stages of the growth.

2. The importance of the x-ray in every case of fracture due to slight trauma.

3. The slow growth and absence of metastasis in giant-cell sarcoma of the long bones.

BIBLIOGRAPHY.

- ¹ Bloodgood: Benign Bone Cysts. (*Annals of Surgery*, August, 1910.)
- ² Brode: Casuistic Contribution to a Study of the Osseous System. (*Muench. med. Wochenschr.*, Vol. LVIII, 1911.)
- ³ Coley: A Plea for the More Conservative Treatment of Sarcoma of the Long Bones. (*Journ. Amer. Med. Assoc.*, Vol. LIV, p. 333, 1910.)
- ⁴ Gangolphe: Conservative Treatment of Presumably Malignant Sarcoma of the Long Bones. (*Lyon Chirurgical*, Vol. II, No. 6, 1909.)
- ⁵ Manclaire and Burnier: Solitary Cysts of the Bones and Fibrous Osteitis. (*Archiv. G n rales de Chir.*, Vol. V, p. 875, 1911.)
- ⁶ Ropke: Solitary Cysts of the Long Bones. (*Archiv. fuer klin. Chir.*, Vol. XCII, No. 1, 1910.)
- ⁷ Simmons: Cysts of the Long Bones. (*Boston Med. and Surg. Journ.*, Vol. CLXI, p. 392, 1909.)
(For a complete bibliography previous to 1910, see Bloodgood, *Trans. Amer. Surg. Assoc.*, 1910.)

INTERNATIONAL EFFORTS TO SAVE ENERGY.

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Introduction.—A prominent European medical journal* recently published a timely article dealing with the conservation of energy in medical publications, and the *Journal of the American Medical Association* of June 28th, 1913, considered it opportune to give a somewhat extended extract of this article. This shows that Prof. Wilhelm Ostwald's teachings concerning the saving of energy by internationalizing all human knowledge, after having attained substantial successes in other scientific quarters, are at last beginning to awaken also medical scientists to a realization of the importance of the subject. It is, therefore, to be expected that physicians will take interest in the following article which the writer, with permission of the author, has taken from an international magazine, little accessible and unintelligible to medical men, and which he has supplemented so that the reader may be able to comprehend Ostwald's ingenious plan of the *Weltformat* (universal book size). The article will impart to physicians an insight into the movement to internationalize all human knowledge for the purpose of saving energy (first part of the article), and thus they will be able to appreciate the object of Ostwald's proposed reform in the make-up of books (latter part of the article) which undoubtedly would benefit medical no less than other scientific men.

THE BRIDGE.**

The Bridge is the greatest enterprise ever undertaken for the purpose of uniting and organizing the intellectual work in the whole civilized world. Its motto is expressed in these words of Ostwald: "The deciding word for the benefit of humanity does not belong nowadays to the inventor or discoverer, but to the organizer. The organization of the Bridge is, therefore, a postulate of present times."

The magnificent plan of the Bridge has been set forth in detail in the book, "The Organization of the Intellectual Work Through the Bridge," by Buehrer and Saager (Seybold, Ansbach, 1911). This work will be analyzed in the following lines. The book is of fundamental importance for the enterprise and shows a fundamental tendency. We shall not insist upon the philosophical considerations constituting the basis and motive of the project and dealing with relations of intellectual work, pure and applied, with relations of theory and practice and their essential

*J. Kollarits: Der energetische Imperativ—Ostwald—und die medizinischen Zeitschriften. (*Wien. klin. Wochenschr.*, May 8th, 1913.)

**Dr. L. Couturat, *Progreso*, Paris, January, 1912.

unity. It is evidently necessary to unite all scientific work, the more so as it grows in extent and rapidity. On one side every scientist has to specialize more and more, that is to restrict himself to a small branch of science, in order to cultivate, and be fully conversant with, it. On the other side, he must universalize his thought and knowledge more and more. Science always aims at completeness ("remainderlessness" after a favorite expression of the author's). The intellectual workers, therefore, are more and more in need of union and mutual help. They are isolated, as it were, in separate islands. Between these islands bridges should be constructed. Herein lies the metaphor which has inspired the symbolical name of the enterprise.

The internationality of science has long been recognized and 'bridges' between the different nations have been started. The cultivators of the same science in all countries communicate through reviews and partly through international societies. In this way the scientists are classified, not according to nations, but according to their special branches. But these various branches should also intercommunicate so that the system of intellectual work may become a real 'organism.' Moreover, interpenetration of all sciences forms a condition of their progress. For instance, physics and chemistry had long remained two different branches until the discoveries of Ostwald, Arrhenius, and others had fused them into one science, physico-chemistry. Nowadays every chemist must be to some extent a physicist, every physicist to some extent a chemist, and there is no longer a barrier between the two domains which are governed by the same ideas, principles, and laws.

Hence division of labor which is a condition of progress requires as a necessary complement union of labor, and this stands in conformity with the principle of saving of energy. For if every worker has to fulfil his own task for which he is most fitted, he must also derive profit and help from the work of the others. In this way it will be avoided that two or more workers are occupied with the same task (not knowing one another), or, on the other hand, that a certain branch or domain hitherto unexplored is neglected. The organization of the work must produce the true encyclopedia: not the encyclopedia written once in some book that soon becomes antiquated, but a living encyclopedia which consists of the ever-growing sum of acquired knowledge and exists only in the heads of the united workers.

To realize this encyclopedia it is sufficient that every worker may be able to obtain any information from any other worker. Books represent only the past, which, however recent, become old quickly. To attain all the knowledge buried in books, a complete and systematized bibliography is required. The International Institute of Bibliography in Brussels takes care of this, registering and classifying all the books which appear incessantly.*

*Of the 25,000,000 books which have appeared until now the Institute has registered more than 8,000,000.

There are other documents which are not books, but things, and are kept in museums. All museums have to be catalogued and the catalogues united really to put all knowledge represented by these collections at everybody's disposal. The Bridge will, therefore, necessarily contain an institute of the catalogues of museums (of every variety, of history, science, and art).

Furthermore, all things are indicated by words which very often differ in the different languages. The cataloguing of all objects of knowledge implies, therefore, necessarily the collection of their names in all languages and must give rise to the Universal Dictionary of which another institute of the Bridge will take care. It is evident that the constant quest of international names through comparing the words equivalent in the principal languages constitutes this enterprise's preparatory work. The latter is being carried out by the academy for Ido, the most scientific, most advanced, and most practical of all international languages hitherto devised (the number of which is approximately 250). All the lists of new words proposed to this academy by students of Ido represent extracts, as it were, of the Universal Dictionary which the promoters of the Bridge are dreaming of.

So much for the past. As to the present knowledge which is not yet laid down in books, but exists only in the 'heads,' it is necessary to render feasible personal intercommunication between the various workers, and for this purpose, to collect their addresses with indication of their special branches and competencies. There are already partial registries, directories, etc. These will not be suppressed, but united into a Universal Directory. Suchwise the Bridge will become the common registry of registries. Any one needing any information or document will only have to send a question to the Bridge, and will receive the address of the competent person or bureau capable of furnishing the answer. The Bridge, in the scientific world, will play a rôle similar to that of the central telephone station in a big city. It will be able to put anyone into communication with anyone else, and to furnish the proper answer to every question.

As to the future, the Bridge will take care of the organization of the intellectual work in a more perfect manner than ever before for the purpose of facilitating intercourse between the workers and of saving their labor to the highest possible degree. Among the means of uniting the workers and facilitating their intercourse, the 'auxiliary language' will evidently play an eminent part upon which we do not need to insist here; for all scientific unions and uniformities hitherto established—unity of measure, uniformity of nomenclatures, signs, formulas, etc.—aim at, and converge towards, one complete scientific language. As Ostwald has strikingly pointed out, the things themselves, and their images, are international; their names must also become international as far as they are not yet such. Unity of language is the most urgent requirement of unity of science and union of the scientists.

Language is only the vehicle of thought. It is not sufficient that every thought or knowledge may circulate freely, thanks to the International Language, from one end of the world to the other. It must always conserve its mobility in order to enter into combination with any other thought. This is the most original idea of the authors. To constitute the ideal encyclopedia it is of importance that every knowledge may enter various relations and classifications; that every worker and thinker may be able to combine with many others according to his need and intention. For instance, let us imagine the collection of photographs of all the paintings of the world. One may classify them according to authors; another according to times (for example, he may wish to collect the paintings of the sixteenth century); another according to places (for example, a visitor of a museum wishes to have a collection of the paintings contained herein); another according to subjects (for example, one may wish to collect all the Madonnas, or Holy Families, etc.); another according to some technical or practical subject (for example, an archeologist may want to have a collection of all photographs relating to a certain handicraft, or to a certain object the history of which he is studying: bed, chair, custom, etc. To fulfil these diverse requirements there is only one means: to edit all photographs separately or separably so that every one may be able to form his collection himself according to his own need and judgment. For instance, the archeologist, lastly alluded to, does not need an entire collection of the works of Rafael, Leonardo, Titian, Rubens, Van Dyck, etc., and he will not buy all these collections to extract from them the photographs required; setting aside the immense loss of time involved in exploring all these collections.

Now, the same refers to all kinds of knowledge. Hitherto they have been enclosed in books, that is, bound up immovably with many others in fixed series relating only to one special point of view. Consequently one needing some information has to search many books and extract from them the material of his work or the elements of his knowledge. Thoughts buried in books are no longer movable and freely combinable. They are confined in a special order, and yet they could and ought to enter many other relations (think of the manifold combinations that may be formed by a few elements; and remember that most inventions and creations of the human mind consist of new combinations of elements already existing and acquired). The greatest enemy of intellectual work is the binder. Inversely, to render thought free it is necessary to split, as it were, and dismember the books. Just as it would be necessary to have separate photographs of the single works of art, so also separate monographs of every subject of knowledge are required. For the investigator books are burdensome masses. Often one needs only one or a few pages, and for the sake of these pages he has to load both his mind and library with a useless ballast.* If all books were reduced to short monographs,

*The authors thus arrive again at several ideas of Leibnitz who dreamt of a similar encyclopedia. He also said that often there existed in thick books only one or a few new and interesting thoughts worthy of conservation, the rest being merely ballast.

those needed could be readily collected and conveniently combined. And this would render needless the composition of new books repeating in another order what is contained in previous books. Every one would compose his books according to his need and taste.

To facilitate the preservation and combination of these monographs they all ought to have the same *format* (book size). Thus arises the problem of rendering uniform the sizes of books. If all monographs, booklets, and pamphlets had the same size, they could be combined and bound together either by ordinary binding, or preferably in cardboard boxes, to be at liberty of following any other order or combination. Moreover, this uniformity of the size of books is desirable even for present-time libraries and books. Owing to the present diversity of volume-sizes much space is lost when the books are classified according to subjects, for the space has to be measured to fit the largest books. If the books are classified according to size, then much time is lost in searching in different places for books relating to the same subject. It would, therefore, be greatly preferable that all books and printings have the same size. They could then be arranged in the smallest space either on the shelves of libraries or in chests, cardboard boxes, etc. This would also simplify the making of paper and printing, for only one type and size of machines would be needed for producing and printing sheets of the same size. Of course, this requirement concerns mainly scientific works. Works of literature and art might differ through extraordinary and peculiar sizes. But for the intellectual workers evidently such a reform would have only an immense advantage.

Now what ought to be the universal *format* (book size)? Ostwald, through scientific deduction, has arrived at an elegant solution of this problem.* The *formats* should produce one another by simple folding of the sheet in 2, then in 4, in 8, . . . in 2^n parts.** It is further desirable that the proportion of the sides be the same in all *formats*. The latter requirement added to the first condition determines this proportion.† It must be $\sqrt{2}$. There remains to be determined the absolute size of one *format*, or simply one dimension. For then the others will be determined as shown below. The metric system, or more exactly the C. G. S. system,†† is the international system of science. In order to suppress, therefore, any arbitrary selection of the fundamental dimension it is necessary to adopt for it 1 centimetre. Two series of dimensions are thus obtained (in centimetres; bear in mind that $\sqrt{2}=1.4142$. . .):

*W. Ostwald: Das wissenschaftliche Weltformat fuer Drucksachen (Seybold, Ansbach, 1911); Das einheitliche Weltformat, in Boersenblatt fuer den Deutschen Buchhandel, October 18th, 1911.

**This is now the case with the book sizes: in-plano, in-folio, in 4 to, in -8vo, in 16mo. . . .; but the original folio has very different dimensions which are called in French: *raisin*, *jésus*, *couronne*, *carré*, etc. etc.

†For the derivation of the square root of 2 as the constant proportion of the sides, see the supplement to this article.

††C. G. S.=centimetre, gram, second (fundamental units of length, mass, and time).

1	2	4	8	16	32
1,414($\sqrt{2}$)	2,83($2\sqrt{2}$)	5,66($4\sqrt{2}$)	11,3($8\sqrt{2}$)	22,6($16\sqrt{2}$)	45,2($32\sqrt{2}$).

By arranging these two series into one according to increasing terms a geometrical progression is obtained with the quotient $\sqrt{2}$ —namely:

$$1 \quad \sqrt{2} \quad 2 \quad 2\sqrt{2} \quad 4 \quad 4\sqrt{2} \quad 8 \quad 8\sqrt{2} \quad 16 \quad 16\sqrt{2} \quad 32 \quad 32\sqrt{2}$$

Two succeeding terms of this series furnish the dimensions (sides) of one *format* (book size). The pocket size convenient for small books is 11,3x16 ($8\sqrt{2}$ x16), and the size of scientific works is double: 16x22,6 (16 x $16\sqrt{2}$). The sizes above and below these two may be used for other purposes (partly for art collections, geographical and other charts, engravings, placards, etc.: partly for booklets, photographs, postal and other stamps). It will, of course, be possible to construct boxes and chests suitable for these sizes; envelopes for letters corresponding to the *format*, etc. In this way the *Mono-format* is determined by most objective scientific deductions free from any arbitrary choice or personal taste.*

These are the fundamental ideas of the *Monosystem*: the idea of the monographs and the idea of the *Mono-format*. But no matter how important in practice these material sides and consequences of the enterprise may be, they should not make us forget and neglect the fundamental and philosophical principles underlying the idea of the Bridge—namely, the union of all intellectual workers and the creation of a living and perpetual encyclopedia, in other words the practical intercommunication and the rendering common of all subjects of human knowledge. This is a grand project. It would greatly promote the development and progress of science and civilization and would contribute, indirectly but effectively, to the intellectual unity of mankind.**

SUPPLEMENT.

In the original article Couturat does not show how Ostwald arrives at $\sqrt{2}$ as the constant proportion of the sides in the *universal format*. But for a proper understanding of the subject in question it is very important to know the derivation of the term $\sqrt{2}$. The writer, without being able to procure Ostwald's writings relating to the *Weltformat*, has therefore tried to derive this proportion from the two conditions given, and having succeeded in finding the derivation he supplies it here for the reason just mentioned and for the satisfaction of those readers who find pleasure in mathematical deductions.

To fulfil both conditions the *universal format* cannot be but rectangular. Now let a be the long side and b the short side of the first *format*.

*The authors of the book, for empirical and practical reasons, have originally proposed the *format* 11,5x16,5 as *Mono-format* (taking the average value of the most common pocket *formats*). After the intervention of Prof. Ostwald the *Mono-format* was definitively fixed at 11,3x16, and the double *Mono-format* at 16x22,6.

**The address of the Bridge is: Die Brücke, Schwindstrasse, 30, Muenchen, Deutschland.

Since from this *format* the second one is to be obtained by one folding, its long side will be b and its short side $\frac{1}{2}a$. In the third *format* the long side will be $\frac{1}{2}a$ and the short side $\frac{1}{2}b$, etc.

	Long Side	Short Side
First <i>Format</i>	a	b
Second <i>Format</i>	b	$\frac{1}{2}a$
Third <i>Format</i>	$\frac{1}{2}a$	$\frac{1}{2}b$
Fourth <i>Format</i>	$\frac{1}{2}b$	$\frac{1}{4}a$
Fifth <i>Format</i>	$\frac{1}{4}a$	$\frac{1}{4}b$
Sixth <i>Format</i>	$\frac{1}{4}b$	$\frac{1}{8}a$
·	·	·
·	·	·

The second condition requires that the proportion of the long side to the short side be the same in all *formats*. This gives the following equations:

$$(1) \frac{a}{b} = \frac{b}{\frac{1}{2}a}; \quad (2) \frac{b}{\frac{1}{2}a} = \frac{\frac{1}{2}a}{\frac{1}{2}b}; \quad (3) \frac{\frac{1}{2}a}{\frac{1}{2}b} = \frac{\frac{1}{2}b}{\frac{1}{4}a}; \quad (4) \frac{\frac{1}{2}b}{\frac{1}{4}a} = \frac{\frac{1}{4}a}{\frac{1}{4}b}; \text{ etc.}$$

All these equations can be reduced to the first one—namely:

$$\frac{a}{b} = \frac{b}{\frac{1}{2}a}, \quad a^2 = 2b^2, \quad \frac{a}{b} = \sqrt{2}.$$

Assuming the first *format* to be $32\sqrt{2} \times 32$ cm. the other *formats* would be:

	Long Side	Short Side
1st <i>Format</i>	$32\sqrt{2}$ cm.	32 cm.
2nd <i>Format</i>	32 cm.	$16\sqrt{2}$ cm.
3rd <i>Format</i>	$16\sqrt{2}$ cm.	16 cm.
4th <i>Format</i>	16 cm.	$8\sqrt{2}$ cm.
5th <i>Format</i>	$8\sqrt{2}$ cm.	8 cm.
6th <i>Format</i>	8 cm.	$4\sqrt{2}$ cm.
7th <i>Format</i>	$4\sqrt{2}$ cm.	4 cm.
8th <i>Format</i>	4 cm.	$2\sqrt{2}$ cm.
9th <i>Format</i>	$2\sqrt{2}$ cm.	2 cm.
10th <i>Format</i>	2 cm.	$\sqrt{2}$ cm.
11th <i>Format</i>	$\sqrt{2}$ cm.	1 cm.

When these numbers are arranged according to increasing values, a geometrical progression is obtained with the quotient $\sqrt{2}$:

$$1, \sqrt{2}, 2, 2\sqrt{2}, 4, 4\sqrt{2}, 8, 8\sqrt{2}, 16, 16\sqrt{2}, 32, 32\sqrt{2}.$$

Each two successive terms of this series furnish the sides of one *format*.

THE TREATMENT OF SYPHILIS.

By RICHARD L. SUTTON, M. D., of Kansas City, Mo.

Few diseases respond so favorably to intelligent treatment as lues, and few diseases are more often wrongly treated. A thorough knowledge of so protean a malady as syphilis can be gained only by serving a long and tedious clinical apprenticeship, and yet there is a host of untrained enthusiasts who fondly imagine that the possession of a 'salvarsan outfit' is all that is necessary to change them into full-fledged syphilographers, just as many a practitioner deludes himself with the belief that he is a dermatologist because he can run an x-ray machine.

One of the most important steps in the successful treatment of a case of syphilis is the education of the patient. Daily cleansing of the teeth and gums, proper regulation of the bowels, frequent or occasional hot baths, abstinence from tobacco and alcohol, care in the promiscuous use of drinking cups and other tableware,—all of these are essential to the comfort and welfare of the infected individual and the safety of his associates.

In the matter of therapeutic agents, a brief outline will save time and repetition. The three drugs upon which greatest dependence has been placed are mercury, arsenic and the iodides.

Mercury	Injection	{ Soluble (in water or in oil).	{ Mercuric chloride.
			{ Mercuric iodide.
	Inunction	{ Insoluble (in oil or in lanoline).	{ Mercuric succinamide.
			{ Mercuric benzoate.
	Inhalation (by aid of mask).		{ Mercurous salicylate.
	Fumigation		{ Mercurous chloride.
	By mouth	{	Gray oil.
			{ Mercurial ointment.
			{ Mercury in olive oil.
			{ Mercuric chloride.
			{ Mercurous chloride.
	By mouth	{	{ Mercuric iodide.
			{ Mercurous iodide.
			{ Mercurous tannate.
			{ Gray powder (mercury with chalk).

Arsenic (usually by injection).....	{	Liquor potassii arsenitis.
		Atoxyl.
		Arsacetin.
		Sodium cacodylate.
		Soamin.
".....	{	Salvarsan { In alkaline solution.
		{ In acid solution.
		{ In oil.
		Neosalvarsan.
		Sodium iodide.
Iodine (usually by mouth).....	{	Potassium iodide.
		Calcium iodide.
		Ammonium iodide.
		Ferrous iodide.

In the writer's own practice, the line of treatment usually carried out may be delineated as follows: A diagnosis of syphilis having been made, the patient is informed of the nature and course of the disease and the danger of communicating it to others, and instructed regarding the care of his teeth. The urine is then examined, and the blood-pressure taken. If the urine is normal, and the arterial tension not excessive, the patient is given a cathartic (2 c.cm. pills, U. S. P., followed by a saline), and, after the bowels have acted freely, a dose of morphine (gr. $\frac{1}{4}$, hypodermically). One hour later, 0.6 gm. of an alkaline solution of salvarsan is given, intramuscularly, in the lumbar region, the dose being equally divided between the two sides. The method of preparing the drug for administration is a modification of the Alt-Lesser technique. All instruments and utensils, and the 4 per cent. sodium hydrate solution are sterilized by heat. In passing, it may be stated that the physician who habitually depends upon his druggist, or upon anyone else who has had no training in surgical asepsis, for the sterilization of instruments and the preparation of the material to be injected, is guilty of malpractice. The salvarsan is dissolved in 6 c.cm. of sterile water by the aid of rough-surfaced glass beads. Four drops of a 1 per cent. alcoholic solution of phenolphthalein are placed in the mixture to serve as an indicator, and the sodium hydrate solution is then added, drop by drop, with a small pipette, meantime vigorously shaking the mixture, until the resulting emulsion is slightly but permanently pink in color. The mixture is then drawn into a 10 c.cm. all-glass syringe, and the injections immediately made.

Care must be taken to place the dose properly into the middle of the muscle mass. There is commonly some lumbago-like pain for a few days, but if the dose is properly prepared and injected this is seldom great enough to incapacitate the patient for ordinary labor. The main points to be considered in preparing the drug for injection are slight alkalinity (for this reason a 4 per cent. NaOH solution is preferable to the 15 per cent. generally recommended), minimum bulk, and absolute cleanliness.

Following the first dose of salvarsan, active mercurial treatment, preferably by injections of biniodide, daily or on alternate days, is instituted,

and continued for three months. If circumstances render the injection method impracticable, daily inunctions of mercurial ointment (pushed until the physiological effect is obtained), with a hot or Turkish bath once or twice weekly, constitute the next most efficacious plan. Thirdly, the writer would place bichloride by the mouth (in doses of $1/20$ to $1/4$ gr., with plentiful amounts of water, after meals), and last, and by far the least valuable of all, the protiodide pill. In children, inunctions, or bichloride or gray powder by the mouth, give the best satisfaction.

At the end of three months, all mercurial treatment is stopped for a fortnight (in order that the kidneys, if in an irritated state, will have an opportunity to recuperate), and the salvarsan therapy repeated. After a brief rest the mercurial routine is again taken up, and continued for a second period of three months. In a few instances, nine months of treatment, as here outlined, is sufficient permanently to arrest the course of the disease, but such instances in the writer's experience are rare, and in the absence of reliable laboratory assistance and opportunities for frequent clinical inspection it is wiser to continue the treatment more or less vigorously for at least two years. After the first twelve months, small amounts of iodide, preferably the sodium salt, may be advantageously employed. If the disease has been present for some time when the patient comes under observation, the iodide may, of course, be used from the start.

In some instances, particularly in syphilis involving the nervous system, large amounts (from 200 to 300 gr. per day) may be required before the desired result is obtained, but in the majority of cases the writer seldom goes above 10-15 gr., after each meal. He prefers that it be taken in aqueous solution, followed by a glass of sweet milk or milk and cream.

At the end of a year and a half, if all goes well, serum tests may be instituted looking forward to discontinuance of treatment. If no clinical evidence of the disease is to be found, a six weeks' vacation from medicine is taken, and at the end of that time a blood test is made. The writer prefers the original Wassermann technique, although in experienced hands Noguchi's modification is reliable (incidentally, too much faith should not be placed on the result of a single test at any time, no matter how reliable and skilled the serologist may be). Should the examination at this time prove absolutely negative, a further rest of three months is taken, providing, always, that no fresh lesions crop up, and a second examination made. If still negative, a further rest of six months, and a third test. A year later, a final serum examination is made. Should any of the analyses show a positive reaction, treatment is immediately instituted and continued for at least three months. In all stages of the disease it must be borne in mind that the iodides alone never cured a case of syphilis, and that mercury and arsenic are the treponemicidal agents upon which reliance must be placed. Throughout the period during which the

patient is under treatment, the bowels and kidneys should be kept active, salines and alkaline diuretics being employed if necessary.

The writer has been criticized because of some rather radical objections to various methods of treatment which are much in vogue just at present.

In those countries where syphilis is quite prevalent and where the disease has been most thoroughly studied, mercury by intramuscular injection and by inunction has been found to be one of the surest means of eliminating the infection. While the inunction method is efficient, it is cumbrous and dirty, and the average American, cleanly, impatient and frequently careless, is very liable to neglect his treatment if the rubbings are left to his discretion. Swift,¹ in his careful work on the effect of mercury on the Wassermann reaction, found that injections of the biniodide were the most efficient and reliable. The writer at first tried a widely advertised and quite expensive proprietary preparation of the salt, but now depends entirely upon a freshly prepared 1 per cent. solution in sesame oil (to which a small percentage of tincture of iodine has been added). Injections of gray oil also are valuable, but occasionally the dose lodges in the subcutaneous fat instead of in the gluteal muscle, and trouble results. A satisfactory formula for a non-soluble preparation of mercury follows:—

R	Mercurous salicylate.	2.0
	Anesthesin.	2.0
	Lanolin.	4.0
	Olive oil.	30.00

M. et sig.: Inject 1 c.cm. (fifteen drops) in gluteal muscles twice weekly. (Shake well.)

Sodium cacodylate, as a remedy in syphilis, was extolled by Murphy² in 1910. Prior to that time the writer had tried the drug in psoriasis and in lichen planus, but with no resulting benefit. Nichols³ tested it on infected rabbits and found it worthless.

Shortly after neosalvarsan was introduced, the writer was furnished a small amount (25 doses) of the preparation for experimental use. His experience with it was so unsatisfactory that he never gave another injection after the initial supply was exhausted. Although much easier to prepare for administration than the older arsenical, the benefit derived from its use was in no respect comparable to that obtained from salvarsan.

At first the writer was surprised, but later, when the reports from foreign fields began to appear, he felt less so. Robinson,⁴ following a personal interview with Ehrlich, said: "The principal topics of conversation were salvarsan and neosalvarsan, 606 and 914. I regret to have to report that he was not at all enthusiastic about neosalvarsan, and did not want anybody else to be prematurely enthusiastic about it. It was entirely too soon to pass judgment upon it. He spoke about it with extreme reserve. And when I spoke of the favorable reports that had

appeared so far, he did not seem quite pleased, and called my attention to the unfavorable reports that had appeared in the *Deutsche medizinische Wochenschrift* of July 30th, 1912. But so much more firm and positive was he in his faith in salvarsan that he spoke with unconcealed bitterness about the factional spirit that had been injected into the discussion on the subject, and the unworthy unscientific attitude of men, for instance, like Gaucher."

Ketron,⁵ a volunteer assistant in Finger's clinic in Vienna, who has been spending some months in the various German medical centres, states that "the use of neosalvarsan has been practically abandoned, as results show that it is not nearly so effective as the original product." That the remedy lacks in safety as well, a glance over some of the current literature will show. Wolff and Melzer⁶ report a death following its intravenous use, Wahle,⁷ two instances of neosalvarsan poisoning, Bernadot,⁸ a case in which grave intoxication followed its administration, and Rindfleisch,⁹ two deaths following intravenous injections.

Now just a word regarding the merits and demerits of the intravenous method of administration. Years ago, when the writer practised general surgery, we sometimes hesitated as to the advisability of giving decinormal salt solution intravenously, for the results then, as now, occasionally were disastrous. If one sometimes hesitates to give so innocuous and non-irritating a mixture as sodium chloride and water by this route, how about so notoriously irritating a substance as arsenic? The fact that some very able men at present indorse the method does not necessarily mean that it is free from danger. Although recognized authorities probably make fewer mistakes than other people, individuals possessing infallible judgment are as rare in medicine as in any other profession. The writer has had an opportunity to study sections from the brain of a patient who died shortly after receiving a dose of salvarsan intravenously, and the widespread signs of acute hemorrhagic encephalitis present were more than sufficient to convince him that death by syphilis is preferable to death by injudicious medication.

Not all of the advocates of intravenous salvarsan therapy are willing to stand to their guns when it comes to the acid test. Fortunately, not all syphilographers are reticent, however, as the reports of Wechselmann,¹⁰ Kleineberger,¹¹ Portner,¹² Quérat,¹³ Marata,¹⁴ Caussade and Regnard,¹⁵ Abadie, Petges and Desqueyroux,¹⁶ Hoffmann,¹⁷ Kannengeiser,¹⁸ Marschalko and Veszpreini,¹⁹ Spiethoff,²⁰ Risson,²¹ Oltramare and Caraven,²² Almqvist,²³ Fischer,²⁴ Schestopol,²⁵ and others amply demonstrate.

Craig,²⁶ in an analysis of 225 cases, found that the best results, judging from repeated serum tests, followed the intramuscular injections of the alkaline solution. The writer's experience with oily suspensions of the drug has not been satisfactory. The indurated masses which frequently develop following the injections are both painful and persistent, and in two instances proved exceedingly troublesome.*

*Since this article was written, Hazen (*Journ. Amer. Med. Assoc.*, p. 1618, May 24th, 1913) has reported similar untoward results following the use of oily suspensions.

Since the autumn of 1910, when the writer received his first supply of salvarsan from the Rockefeller Institute, through the courtesy of Dr. Flexner, he has given over 3,000 doses of the drug intramuscularly, in alkaline solution. With the exception of three refractory abscesses, all of which occurred prior to January, 1911, and which were the result of improper technique, he has not had an untoward result of any kind.

While not a fanatic on the subject of salvarsan, the writer does know the drug to be an exceedingly valuable one in the treatment of syphilis, provided it is properly administered. Otherwise, he feels that the danger entailed more than counterbalances the benefit to be derived.

BIBLIOGRAPHY.

- 1 Swift (*Archives Int. Med.*, Vol. 6, p. 625, 1910).
- 2 Murphy (*Journ. Amer. Med. Assoc.*, p. 1113, September 24th, 1910).
- 3 Nichols (*Journ. Amer. Med. Assoc.*, p. 492, February 18th, 1911).
- 4 Robinson (*Critic and Guide*, p. 416, November, 1912).
- 5 Ketron (*Urologic and Cutaneous Review*, p. 82, 1913).
- 6 Wolff and Melzer (*Muench. med. Wochenschr.*, No. 31, 1912).
- 7 Wahle (*Muench. med. Wochenschr.*, Vol. LX, p. 354, 1913).
- 8 Bernadot (*Ann. de Dermatol. et de Syphil.*, p. 714, 1912).
- 9 Rindfleisch (*Berl. klin. Wochenschr.*, p. 551, 1913).
- 10 Wechselmann (*Urologic and Cutaneous Review*, p. 117, *et seq.*, 1913).
- 11 Kleineberger (*Deutsch. med. Wochenschr.*, No. 36, 1912).
- 12 Portner (*Dermat. Zeitschr.*, Vol. XIX, No. 12).
- 13 Querat (Mentioned by Wechselmann, *loc. cit.*).
- 14 Marata (*Rev. de med. y chirurg. prac.*, February 28th, 1911).
- 15 Caussade and Regnard (*Bull. et mém. Soc. méd. des. hôp. de Paris*, February 20th, 1911).
- 16 Abadie, Petges and Desqueyroux (*Ann. de Dermat. et de Syph.*, p. 17, 1913).
- 17 Hoffmann (*Muench. med. Wochenschr.*, No. 4, 1912).
- 18 Kannengeiser (*Muench. med. Wochenschr.*, No. 34, 1911).
- 19 Marschalko and Veszpreini (*Deutsch. med. Wochenschr.*, No. 26, 1912).
- 20 Spiethoff (*Muench. med. Wochenschr.*, No. 35, 1911).
- 21 Risson (*Med. Klinik*, No. 11, 1912).
- 22 Oltramore and Caraven (*Ann. de Malad. Vénériennes*, December, 1911).
- 23 Almquist (*Muench. med. Wochenschr.*, No. 34, 1911).
- 24 Fischer (*Muench. med. Wochenschr.*, No. 34, 1911).
- 25 Schestopol (*Berl. klin. Wochenschr.*, April, 1913).
- 26 Craig (*Arch. Int. Med.*, September, 1911).

SYPHILIS OF THE NERVOUS SYSTEM IN INFANCY, CHILDHOOD, AND EARLY ADULT LIFE.

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It is now definitely determined that the infective agent of syphilis is the *spirochæta pallida*. This organism can usually be isolated from the primary, secondary, and less frequently from the tertiary lesions of acquired syphilis. It can be found in the liver and the spleen and in many other tissues of the stillborn fetus or of the child who dies shortly after birth of the so-called inherited or congenital malady. According to Mott, the facts of hereditary syphilis were first established and placed upon a firm foundation by the works of Barendsprung, Wagner, Colles, Virchow, Fournier, Hutchinson, Barlow and Bury. Syphilis is occasionally acquired in infancy from a mother who was infected subsequent to the birth of the child, or from an infected wet-nurse; and when the disease is so acquired may be followed by the same results as its acquisition in utero, or its sperm or germ inheritance. Usually, however, the child contracts the malady indirectly, being born of parents one or both of whom are suffering from syphilis. In these cases we have to deal with the so-called congenital, inherited or hereditary type of the disease. Just how the infection takes place in utero is not definitely determined. Owen is of the opinion that it is usually from the mother to the child, through the placenta, the mother being or having been at one time the subject of acquired syphilis. If the infection from which the mother is suffering is mild or the virus has been attenuated by time, the placenta may act as a barrier to the infection and the mother give birth to a healthy child. If the infection is recent or severe the result is abortion, a macerated fetus, a premature delivery or a syphilitic infant. According to Colles' law a woman who has shown no evidence of syphilis during her pregnancy may give birth to a syphilitic child. This child will give syphilis to a healthy wet-nurse, but will not in turn infect its own mother. The mother is immune. Many authorities hold to the view that the mother of such a child has latent syphilis, and the Wassermann test usually will so demonstrate. It is the opinion of most authorities that the transmission of syphilis is usually paternal. Occasionally it is maternal, and less frequently it is mixed. It is known that the semen of a syphilitic male contains the *spirochæta* long after the primary sore is healed and that when the infection is paternal the virus is supposed to enter the uterus with the semen and later infect the ovum or the tissues of the developing fetus,

and the mother may be infected at the same time. It is also an established fact that the tissues of a syphilitic animal which contain no spirochætae will infect a healthy animal, and the theory has been advanced that the head of the spermatozoon may carry certain chromidian granules capable of transmitting syphilis and that the fetus is infected in this manner. Some authorities believe that when the infection is paternal only, the mother is immune, but Knœpfelmacher, Bauer, Dean and many others believe the mother of such a child syphilitic, and the Wassermann reaction is usually positive. According to Profeta's law, if a healthy woman becomes infected with syphilis during pregnancy, her child, although showing no evidence of syphilis, is immune. It is the opinion of Owen that such a case would give a positive Wassermann reaction. Syphilis, no doubt, is present though latent.

Syphilis and Infant Mortality.—Syphilis is responsible for much sterility among otherwise healthy women. It has been estimated that 46 per cent. of the pregnancies end prematurely in syphilitic women. 42 per cent. of the infants, born syphilitic, die during infancy. Fournier found abortion or premature labor in 140, or 70 per cent., of 200 pregnancies in 100 syphilitic women. Of 90 women who had become pregnant during the first year after the infection, 50 aborted or had children born dead, 38 gave birth to children who soon died, and 2 gave birth to children who survived. This would indicate that pregnancy, shortly following the infection, is fraught with more danger to the child than are those cases in which considerable time elapses between the infection and the pregnancy. Many syphilitic infants die, during the first years of life, of hydrocephalus, meningitis and convulsions; others give no evidence of the infection during infancy. The symptoms may not be manifested until late in childhood, during adolescence, or early adult life. Fournier reports a case in which the symptoms were not manifest until the fortieth year.

The Incidence of Lesions of the Nervous System in the Inherited Disease.—Fournier, Hochsinger and others have demonstrated that many serious organic nervous diseases of children are the result of congenital syphilis, and Jullien reports that among 162 living children, the progeny of 43 syphilitic parents, 50 per cent. were infected with meningitis and convulsive symptoms. It is the opinion of Mott that when the central nervous system of the infant is invaded by the organism, there is a general spirochæta septicemia which even the administration of mercury cannot overcome sufficiently to prevent a fatal termination; and he stated as his experience that when the nervous system is so invaded few of the children survive till adolescence or puberty. Heubner states that the tissues of congenital syphilitics are affected in the following order: Liver, lungs, spleen, alimentary canal, heart, blood-vessels, and, lastly, the nervous system. Rumpf gives the relative frequency of infection of the nervous system as 13 per cent. The syphilitic child may manifest none

of the classical signs of syphilis, and yet there may have been a profound modification of the embryo during the development by the influence of the syphilitic toxin. The nervous system of such a child is very apt to show evidences of arrested development, early decay, or mal-development. According to Owen the congenital malady is capable of causing dystrophies, abiotrophies and lesions comparable to those seen in other diseases of the nervous system, which are not supposed to be due to syphilis. It is generally conceded that in syphilitic children who survive infancy, the nervous system stands low on the list of frequency in which the various tissues are affected. It is important to note, however, that when the nervous structures are involved the lesions are multiple, extensive, and, more often than not, severe. There is a tendency to generalization of the disease and to a combination of the various lesions: pachymeningitis, leptomenigitis, gummatous deposits and endarteritis. When presented with a case of a nervous lesion in an infant or young subject, there are two questions which should be asked and answered: (1) Is the young patient syphilitic? and (2) if so, are the symptoms due to syphilis? Children with an inherited or acquired syphilis occasionally manifest nervous symptoms which are not syphilitic.

Owen reports a case of a syphilitic child having a typical Erb's palsy of the upper arm type. This condition was obviously due to the traction upon the arm during delivery of the head of the child, the presentation being of the breech variety.

Relative to the nature of the diseases of the nervous system resulting from syphilis in early life, Barlow and Bury make the following statement: "It may now indeed be said, in contrast to the early views, that nearly every variety of nervous affection of acquired syphilis has its parallel amongst congenital examples, albeit there are a few broad differences which may be made out as to relative frequency, alike of lesions and symptoms between the two groups." The following clinical classification as given by Owen, includes the various diseases resulting from congenital or early acquired syphilis: (1) Amaurosis associated with spasticity or cranial paralysis; (2) imbecility, idiocy, and amentia; (3) diplegia; (4) an epileptic group; (5) meningitis and hydrocephalus; (6) hemiplegia, cerebral thrombosis, hemorrhage and embolism, tumor and cranial nerve paralyzes; (7) general paralysis and tabes—cases resembling these metasymphilitic diseases, diffuse cerebrospinal lesions, pseudo-tabes, Charcot's disease; (8) spinal conditions.

Pathology.—Bury, in discussing the pathology of cranial syphilis, states that an involvement of the central nervous system secondary to syphilitic disease of the bone is rare, although the liability of such a result is greater in congenital than acquired syphilis. Humphrey reports a case in which the thickening of the skull at the base of the brain was so marked that the foramina were distinctly narrowed.

Sclerosis of the cranial bones with subsequent thickening may so de-

crease the cranial cavity as seriously to interfere with brain development. The dura mater is frequently the seat of inflammatory deposits and may become so thickened as to assume the appearance of cartilage. This pachymeningitis is usually secondary to a periostitis of the cranial bones. In the piaarachnoid every variety of inflammatory deposit may be found. Acute leptomeningitis is rare. The chronic variety is more common, and the membranes may become fibroid in character or even contain calcereous deposits. Endarteritis, which is so characteristic of acquired syphilis, is equally common in the congenital variety, and the cortex is the seat of the greatest change. Softening may occur, but hardening is much more common. The sclerosis may involve one or more convolutions or may occur in nodular patches. Atrophy and fibrosis of the cortex may be the result of chronic meningitis with deficient blood-supply, and in some cases it occurs without obvious evidences of changes of the membranes or vessels. Evidences of acute encephalitis are rarely seen. It is the opinion of Bury that this is owing to the fact that, when acute encephalitis occurs, the fetus dies in utero or very shortly after birth.

Hydrocephalus of a mild type is not uncommonly present, but is frequently associated with meningitis at the posterior base or inflammation of the ependyma. Mott suggests that in such cases of hydrocephalus, if syphilis cannot be positively excluded or the hydrocephalus otherwise accounted for, a Wassermann test of the blood-serum be made. Gummata are frequently found. Barlow reports a case of a boy aged fifteen months who presented symmetrical gummata on the third, fourth, fifth, sixth, seventh, and eighth cranial nerves at the point of exit from the brain stem.

Symptomatology.—Of the general symptoms associated with congenital syphilis of the nervous system, convulsions are very common. Headaches worse at night are rarely complained of by children under ten years of age. Irritability of the nervous elements is quite common. Attacks of screaming and insomnia are frequently present. Hemiplegia resulting from the endarteritis with sclerosis and meningeal thickening is a symptom which is frequently seen. Such hemiplegia is usually preceded by unilateral convulsions. Hemiplegia may occur suddenly without antecedent convulsions. In such cases the parents frequently report that the hemiplegia is the result of a fall, but on the contrary the fall is an effect of the hemiplegia. Dysarthria or aphasia is quite frequently associated with congenital syphilis. Any one or several of the cranial nerves may be affected by congenital syphilis as well as by the acquired variety. Nerves may be unilaterally or symmetrically involved. Iritis and keratitis are seen, but one of the most important symptoms of congenital syphilis is disseminated choroiditis, and every suspected case should be carefully examined with the ophthalmoscope. The deafness which occurs comes on either within five years before or five years after puberty.

Imbecility and Amentia.—The relations of congenital syphilis and men-

tal defectiveness have been widely discussed and the conclusions reached are widely various. Summarizing the opinions of Mott, Owen, Bury and various investigators, we reach the conclusions that approximately 20 per cent. of such cases are due to congenital syphilis. The writer believes that if a more careful investigation was made and all idiots were examined for choroiditis, spinal puncture done and a Wassermann test made, we would find that congenital syphilis plays a larger part in the production of this condition than is indicated even by these figures. It is reasonable to suppose that the toxin of syphilis, by its action upon the germ plasm, can so modify its development or cause the failure of some biochemical substance necessary to brain growth as to cause an arrest of development of such a nature that mental defectiveness will result. The writer has seen many cases of idiocy and imbecility presenting no evidences of gross brain lesions or obvious symptoms of syphilis in which it could be demonstrated. He believes, too, that the toxin of congenital syphilis can cause various grades of arrest of development which result in different grades of idiocy and imbecility.

Diplegic Cases.—We recognize two distinct types of diplegic patients, one in which the condition is present at or shortly after birth; the other which develops after a distinct interval following birth. The latter type is almost invariably due to injuries received during birth, but this cannot be considered as a cause of those cases in which the symptoms are present at or immediately following birth. It is the opinion of Owen that the underlying cause of the condition in these cases is a fetal encephalitis most commonly due to syphilis. The consensus of opinion is that syphilis is an important factor in the production of antenatal diplegia. The writer has been able to demonstrate this in the several cases which he has seen.

Fournier, Charcot, Heubner and others consider congenital syphilis as an important factor in the production of Little's disease.

Griffith and Owen advance the opinion that congenital syphilis plays a small part in the production of idiopathic epilepsy. Fournier and Mott, on the contrary, believe that congenital syphilis plays an important part in its production. Mott states that if an ophthalmoscopic examination was made of all such cases, choroiditis would be found quite commonly present.

The writer has seen a number of cases without stigmata in which a careful examination demonstrated the presence of congenital syphilis. Jacksonian epilepsy not unusually results from cortical lesions secondary to congenital syphilis.

Meningitis.—The writer has referred to meningitis in the general symptomatology. The type of meningitis most commonly seen in infants and young children resembles the postbasic type. It involves both the base and vertex. It is not necessary that the patient should show any evidence of congenital syphilis. The condition occurs usually within the first eighteen months of life. The meningitis is acute or subacute with

strabismus, convulsions, vomiting, head retraction and bulged fontanelle as accompaniments; the limbs become spastic. The thickened membranes, atrophied cortex and enlarged ventricles generally constitute the gross morbid anatomy. The course is very chronic, but if antisiphilitic treatment is instituted early, recovery may result.

Hemiplegia is due to many causes. It may occur in young subjects as the result of congenital or acquired syphilis. Owen states that syphilis may be a factor in the hemiplegias of the postnatal type when (1) a hemiplegia develops which has been preceded for some time by premonitory and recurrent convulsions; (2) when separate attacks of paralysis succeed each other at intervals of days or months; (3) when there are prodromal headaches and vomiting; (4) when an acute hemiplegia develops 'silently.' The morbid anatomy in the hemiplegia of this type is usually an endarteritis obliterans or gummatous formations.

Paresis and Tabes.—In 1857 Clouston described a case of paresis in a boy sixteen years of age. Mott says that prior to this time this condition was supposed to be a disease essentially of adult life. It is now generally recognized that paresis may develop in the young secondary to congenital or acquired syphilis. The age at which the disease usually develops is about puberty. It may develop in children who had previously had a fair degree of intelligence, or in those who have been recognized as being feeble-minded. It is frequently confused with dementia præcox. It does not differ essentially in its clinical manifestations from the adult type of disease, although the delusions of grandeur are frequently modified by the age of the individual. Juvenile tabes, while occasionally occurring, is much less common than juvenile general paralysis. In doubtful cases of general paralysis, and in tabes, the spinal fluid should always be examined.

Spinal lesions quite commonly occur in the acquired syphilis of adult life, but are very infrequent with the exception of tabes in the congenital variety. Williamson enumerates the following spinal conditions as occurring in those suffering from hereditary syphilis. Symptoms corresponding to those of a meningomyelitis, Erb's syphilitic spinal paralysis, pseudotabes, multiple lesions, various forms of infantile localized paralysis, may be due to spinal meningitis with involvement of the anterior nerve roots. Harris states that meningeal syphilis may affect the cord and its membranes, as in the adult, and may present symptoms soon after birth or later in life.

Prognosis.—Lesions of the nervous system occurring early in life of whatever nature are serious. This is especially true of lesions occurring secondary to syphilis, syphilitic meningitis and hydrocephalus in the young being usually fatal. If the child be blind because of optic nerve atrophy, there is no recovery. Recovery does not occur in the diplegic cases. Sudden death may supervene or, if the child live, feeble-mindedness more or less serious in character usually results. If antisiphilitic treatment be

instituted early and persisted in for a considerable period of time, the results are sometimes good in the milder type of meningitis, in diffuse cerebrospinal lesions and pseudotabes. If the treatment is not begun in these cases before there is considerable destruction of the nerve elements, then the only thing for which we can hope is an arrest of the process, as there cannot be reconstruction of the nerve elements when they have once degenerated. Epilepsy, secondary or associated with syphilis, may be benefited by a combination of the bromide and antisyphilitic treatment. Whether the condition be syphilitic, parasymphilitic or metasyphilitic, antisyphilitic treatment should be instituted at the earliest possible moment and persisted in continuously over a long period of time, as the results are sometimes rather surprising.

CONCLUSIONS.

1. Lesions of the nervous system secondary to congenital or early acquired syphilis are of quite common occurrence.
2. Those lesions secondary to syphilis which are acquired in infancy or early childhood do not differ in kind or degree from the lesions secondary to congenital syphilis.
3. There may be evidence of gross lesions of the nervous system secondary to syphilis and yet be no obvious symptoms or signs of syphilis.
4. By the aid of the Wassermann test of the blood or cerebrospinal fluid and by a cytological and chemical examination of the cerebrospinal fluid, many obscure conditions may be demonstrated as being secondary to syphilis in which syphilis may not be suspected and cannot otherwise be demonstrated.
5. Hydrocephalus, meningitis and convulsions during early infancy are very commonly secondary to syphilis.
6. The so-called idiopathic type of general epilepsy is not an unusual sequence of syphilis of the young. The Jacksonian type of epilepsy quite frequently occurs secondary to cortical lesions of syphilitic origin.
7. Lesions of the spinal cord other than tabetic are unusual in syphilis of the young.
8. States of mental defectiveness are very commonly caused by syphilis.
9. Any lesion of the nervous system occurring in the young is serious. This is especially true of those lesions occurring secondary to syphilis.
10. Some forms of meningitis, gummatous formations, epilepsy, pseudotabes and a few other conditions occasionally respond to treatment. Juvenile paresis and tabes do not yield to treatment.
11. The treatment should be antisyphilitic and should be pushed to the limit.

SYPHILIS OF THE RECTUM.

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Syphilis of the rectum manifests itself either in primary, secondary or tertiary lesions. It occurs in the anus, anal canal, and within the rectum at all ages and in all classes of society. It may be inherited, or the infection may be acquired at childbirth due to the presence of the disease in the maternal genitals. It may be innocently or accidentally acquired through contact with diseased persons or through the use of toilet articles used by syphilitics, but is most frequently acquired through sexual intercourse, either natural or unnatural. It occurs much more frequently among women than men.

The initial lesion, the chancre, is found around the anus, in the anal canal or in the rectum. The frequency with which it is encountered in the anal region is probably more than commonly supposed, and from statistics is rapidly becoming more prevalent. While it seems to be a not infrequent occurrence in the Far East, especially in the large cities, with us the writer thinks it is rare. He has, in his own practice seen but 3 cases, 2 in females and 1 in a male. All developed secondary lesions later, so there was no doubt of the diagnosis. There was very little pain in any of these cases, a slight feeling of uneasiness around the anus and a discharge being the only symptoms. They all healed kindly and quickly. The writer had a very complete history of these cases, especially regarding the probable mode of infection, but it was destroyed by fire, and as the patients have passed from observation, he is unable to recall anything definite in regard to them. In women, the possibility of infection through the vaginal discharges or from accidental contact with an infected penis is to be considered; but the occurrence of the disease around the anus in the male is very strong proof of sodomy.

The diagnosis between chancre in the anal folds and true fissure *in ano*, according to Ball, Allingham and Kelsey is easily made, owing to the absence of pain in the parts affected, but Tuttle takes exception to this, and cites cases of chancre in the anal folds which had intense pain.

Regarding a differential diagnosis between chancre, chancroid and true fissure *in ano*, the spirochæta may be found in the scraping of an initial lesion. The Wassermann test may also prove positive as early as the third week after the occurrence of the chancre.

Tuttle also calls attention to the "rapidity with which the chain of inguinal glands upon both sides of the body become successively en-

larged, as one of the most reliable diagnostic symptoms of chancre of the anus."

Chancre of the rectum is very rare. Very few authentic cases have been reported.

Congenital syphilis of the anus manifests itself at any time from birth up, but usually demonstrates itself within the first few months of the child's life, lesions of the anus being among the earliest symptoms of hereditary syphilis to appear, and are almost always secondary manifestations of the disease. It occurs as an erythema around the anus, accompanied by a brittle condition of the mucous membrane with numerous small fissures. Very often these fissures are overlooked by the physician, his attention not being directed to them by the nurse or mother. These



Fig. 1.—Syphilitic condylomata of the anus.

lesions are not to be mistaken for those of dermatitis from mechanical causes. An early diagnosis in these classes of cases is greatly to be desired, as it is extremely important that prompt and energetic treatment be at once instituted. Evidence of tertiary syphilis may be found around the anus in the extremely dry condition of the mucocutaneous tissues, with many small, painless fissures.

Secondary syphilitic manifestations of the anorectal region develop the same in the skin and mucous membrane as when the disease is in any other region.

The anus is very frequently the seat of mucous patches, the mouth and throat only being more frequently affected. Mucous patches in the rectum are very rare; none has ever come under the writer's observation.

Condylomata are very common and should be treated by removal with

knife or scissors and cauterising the base with the actual cautery. The differential diagnosis between syphilitic and non-syphilitic condylomata of the anal region is usually not difficult, but a doubtful case can generally be easily and quickly determined by the microscope.

Gummata of the anus are rare, but are not uncommon in the rectum. They occur as localized, smooth, round, elastic, painless deposits in the submucous tissues. They do not break down unless infected, and then form ulcers on the rectal wall. They respond very readily to anti-syphilitic treatment.

The majority of cases of secondary manifestations recover without treatment, the reason for non-treatment being that the patients are so little inconvenienced by the lesions that surgical assistance is not requested. But severe cases, when neglected, may have disastrous results.



Fig. 2.—Tertiary syphilitic ulceration of the anus and rectum. The sphincter ani is entirely destroyed.

Tertiary manifestations are proliferating proctitis, anorectal syphiloma, gummatous deposits, either local or diffuse, ulcerations and strictures. Chronic ulcerations show a great destruction of the mucosa, with infiltration of the underlying tissue. The muscular tunic is thickened and the fibres are forced apart by inflammatory cells and fibrous tissue. The external coat is thick and infiltrated.

Chronic proctitis frequently ends in ulcerations and the formation of sinuses which often become associated with rectal strictures. Sometimes the ulceration is not conspicuous, and the changes in the tissues are then most marked in the submucous and muscular coats. Later this newly formed scar-tissue contracts and the rectum together with the surrounding tissues becomes sclerotic.

The lower half of the rectum is the part more frequently affected, but the entire canal up to the sigmoid may be affected. "The gravity of the disease is in direct ratio to its extension upward in the rectal tissues, or the distance of the lesion from the external anal margin" (Jelks).

Diagnosis of these cases is not difficult, although a case has been reported where a syphilitic rectum was excised for cancer. Another case is reported where the pelvis was occupied by a tumor the size of a large orange, situated between the bladder and the rectum, which was thought to be cancer but on post-mortem proved to be syphilitic. In this variety of cases the mucosa is generally intact.

The most important complication of syphilis of the rectum is the formation of stricture—either annular or tubular. Whether or not this is produced by the anorectal syphiloma, as claimed by Fournier, or is brought about by specific ulceration with subsequent infection, proctitis and fibrous infiltration, as claimed by Tuttle, the writer will not discuss here, as it matters very little to the clinician.

It is more common among young married women in poor circumstances. Fistulae are often present, communicating with the bladder and vagina and extending through the skin, quite often far from the anus.

Syphilis is no less treacherous a disease in the rectum than in other parts of the body. An ulcer of the rectum, be it secondary or tertiary, seen early, responds very kindly to local and constitutional treatment, and heals. The patient passes from observation and returns, after a lapse of months or years, and a fibrous stricture is found on the location of the former lesion. This stricture is not syphilitic tissue, but fibrous tissue, the induration varying in thickness, sometimes being as much as an inch. Ulcerations are present, but they are not now syphilitic ulcers; they are infected sores, caused by the passage of fecal matter, with subsequent infection. This explains why constitutional treatment is useless in advanced stricture of the rectum.

By the contraction and subsequent blocking up of the rectum we have poor drainage, there is a constant formation of pus with the consequent absorption of toxic materials with constitutional infection.

The writer appreciates that in a paper of this kind, space allows for only a few of the most important points to be touched upon, and the main thing to be emphasized is for the clinician to be watchful in every case of syphilis and ascertain if the rectum is involved, for only by early and energetic treatment can be obviated the formation of strictures, which are as incurable as cancer, and which many times render the patient's existence so miserable that a colostomy is the only relief that makes life bearable.

If in every case of syphilitic infection of one end of the intestinal canal—namely, the mouth and throat, careful observation of the other end of the tube—the anus and rectum made, the writer is satisfied that many lesions of those parts would be found which are now being overlooked.

THE PROBLEM OF THE WHITE BLOOD-CELL: AN ESTIMATE OF THE WORK OF PAPPENHEIM AND DECASTELLO.

By GEORGE HOWARD HOXIE, A. M., M. D., of Kansas City, Mo.

It is very unsatisfactory still to report or to read reports of differential white cell counts, because of the lack of uniformity in their classification. Before such a classification can be universally accepted, hematologists must agree on (1) the origin, and (2) age phenomena of the various cell forms. That is, the life history of the white blood-cells must be worked out to the satisfaction of at least the majority of the workers in this field.

As soon as this shall have been accomplished an important practical problem will still remain to be solved—namely, the clinical significance of the changes in the blood picture.

The first real step in the solution of the first of these two problems (*i. e.*, the life history of the white cells) was made by Virchow when he differentiated two types of the white blood-corpuscles; the first he called lymph corpuscles, and the second, the colorless blood-corpuscles. His opinion was that the mononuclear lymphocytes became polynuclear when they entered the blood-stream. That is, the lymphocytes were, in his opinion, developmental forms of the real leucocytes. The lymphocytes in turn were formed among the sessile cells of the lymph follicles.

This classification was not entirely acceptable, but no advance on it was made until Ehrlich inaugurated the new epoch in the study of the white cells by his method of differentially staining the dried blood films. He then classified the cell forms according to their reaction to aniline dyes and showed that the lymphocytes and leucocytes are distinct classes of cells. He subdivided the leucocytes into various classes using both morphological and chemical criteria. His classification is the basis of that most used to-day, and, modified as it appears in the last English edition of his "Anemia," is as follows:—

(a) Normal Forms:

1. Lymphocytes (20-25 per cent.).
2. Large mononuclear leucocytes (1 per cent. or less).
3. Transitional forms. (These with the above constitute 6-8 per cent.).
4. Polymorphonuclear neutrophil leucocytes (65-70 per cent.).
5. Eosinophils (2-4 per cent.).
6. Mast cells (0.5 per cent.).

(b) Pathological Forms:

1. Mononuclear cells with neutrophil granules ('myelocytes' as Ehrlich originally termed them).
2. Eosinophilic myelocytes.
3. Mast myelocytes.
4. Myeloblasts (Nægeli).
5. Stimulation forms (Tuerk)=pathological myeloblasts (Schridde, Nægeli).
6. Pathological lymphocytes (including Riedel's forms).
7. Plasma cells.

Ehrlich himself has not worked, at least, aggressively in this field for several years; and, as the personal names in the foregoing tabulation would indicate, the completion of his system has been left to his followers. His textbook, indeed, has been revised and largely rewritten by Lazarus, of Berlin, and Nægeli, of Zurich. The latter is also the author of an independent volume,* and has proved himself an industrious worker in completing and supporting the Ehrlichian theories.

But the lack of a simple and uniform technique, together with an unwillingness to accept Ehrlich's theory of the origin of the cells, has prevented the classification from becoming universal; hence, the present confusion already referred to. There is due to the opponents of Ehrlich's dualistic theory, recognition for their industry and the consequent gradual clarification of the problem. Some of these opponents, like Patella, believe that some blood-cells originate in the lymph follicles, other cells in the bone-marrow, and still others in the endothelial lining of the blood-vessels. And another group of hematologists, with Pappenheim at the head, believes that there is one mother or germ cell, and that from this cell type may originate both the lymphocytes and the leucocytes.

Perhaps the fairest statement of the problem will be a digest of Pappenheim's article.**

In this summary of the present status of our knowledge of the white blood-cell, Pappenheim starts with the following classification:—

1. Mononuclear lymphoid agranulocytes (or we would say non granular cells), and

2. Polynuclear granulocytes.

These groups are divided again, thus:—

Granulars:

(a) Large monocytes: 2-6 per cent. in normal blood.

Non-granulars:

(b) Mesolymphocytes, lymphocytes and microlymphocytes, 23 per cent. in normal blood.

(c) Mast cells, 0-0.5 per cent.

*Blutkrankheiten und Blutdiagnostik, Lehrbuch der morphologischen Hæmatologie. Leipzig: Veit. 1908.

**Die Ergebnisse der inneren Medizin und der Kinderheilkunde, Vol. 8.

Granulars:

- (d) Eosinophils, 2-4 per cent.
- (e) Neutrophils, 65-72 per cent.

The forms appearing in the circulating blood are the direct descendants of the sessile cells in the hematopoietic tissues. The types appearing in normal blood do not change or develop from one to another. The so-called 'transitional' cells therefore are not aptly termed. Each type of cell as it appears in the normal blood has its own line of development; and these unripe or developmental forms do not appear in the blood under normal conditions. The predecessors of the large monocytes are the round nucleated macrolymphocytes of the interfollicular undifferentiated diffuse lymphadenoid (and splenic) tissue. The ancestors of the small blood lymphocytes are the similar forms in the lymph follicles. And the forerunners of the polynuclears are the cells with round and single nuclei (not segmented)—the so-called 'myelocytes'—which through the metamyelocytes or transitional forms finally become the granular leucocytes.

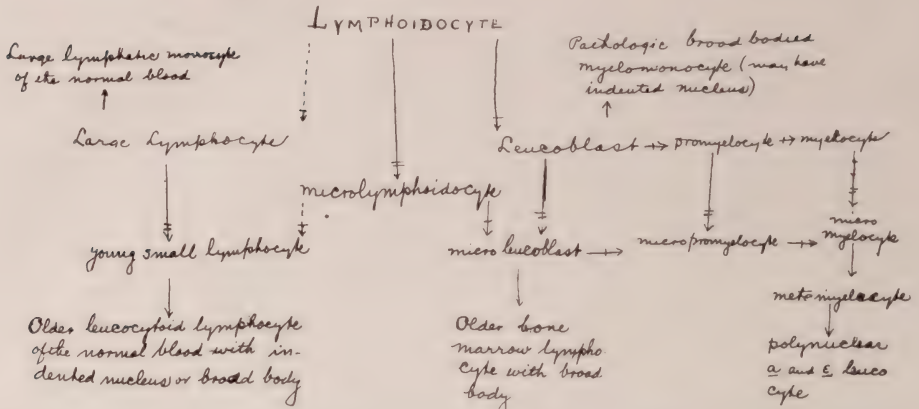
The point of difference between the unitarians and dualists is only whether the primitive lymphoid parenchyma cell of the myeloid tissue (the myeloblast of Nægeli) is a special cell form or is only the large monocyte of the diffuse lymphadenoid tissue, or at least differing only in function from the latter.

And, Pappenheim is careful to add, at any rate, the two cell forms—the large lymphocyte and the leucoblast (myeloblast) are extraordinarily similar. The monocytes of the normal blood are age-forms (descendants, we may say) of the large lymphocyte of the lymphadenoid and splenoid tissue. The primitive leucoblasts (myeloblasts) of the myeloid tissue, which appear in the blood under pathological conditions, form in their age-forms corresponding pathological monocytoid cells—the monocytes of the pathological blood—the appearance of which in the blood shows this to be pathological and points to bone-marrow irritation ('irritation forms' of Tuerk).

Just as the normal granular leucocyte develops from the large leucoblast, so among the non-granulars the small lymphocyte develops from the large lymphocyte, and that by continued proliferation. Therefore, the development is not from the small lymphocyte into the monocyte and then into the polynuclear leucocyte as Grawitz and Plehn believed.

Between the large lymphocyte and the leucoblast of the primitive tissue cells there is an embryonic form, as it were an undifferentiated germ or mother cell—the lymphoidocyte, which is a bivalent cell—a 'personal union' of the lymphoid and myeloid tissue. This cell appears occasionally in post-embryonal life: normally only in the myeloid tissue, pathologically in the lymphadenoid tissue.

The genealogical tree of the white cells is, therefore, the following:—



Pappenheim's diagram of white cell ontogenesis as published in the "Ergebnisse" for 1912.

This classification of Pappenheim's has at least the merit of consistency, and simplifies the clinical picture very markedly, because it rids us of the many names applied by individual observers to the various unripe forms. Following out this principle for the past year, the writer has grouped the white cells into two main classes: (1) Granulars, and (2) non-granulars, and has subdivided each of these into (a) unripe, (b) ripe, and (c) degenerate forms. This has given him considerable satisfaction, in that the report of each blood study has shown him the type of the attack on the body as well as the vigor of the reaction of the body to the attack.

Pappenheim's notion may be somewhat clarified by the inspection of the diagram given in Volume I of his "Atlas" which is reproduced below.

On the very important matter of technique Pappenheim thinks that we now have a satisfactory panoptic stain. Since this is so closely allied to the so-called Wright stain, which we Americans like to use, it is possible that even the Americans may be led to adopt it.

It is a modification of the Romanowsky stain, and he calls it a combination of the May-Gruenwald with the Giemsa. His directions follow. There are two stock solutions to be purchased and kept on hand: the May-Gruenwald, which is an alcoholic neutral mixture of methylene-blue and eosin; and the Romanowsky, which is a concentrated glycerine-alcoholic azure solution. Neither of these solutions gives off its stain unless in aqueous solution; so it is necessary to add water to make them effective.

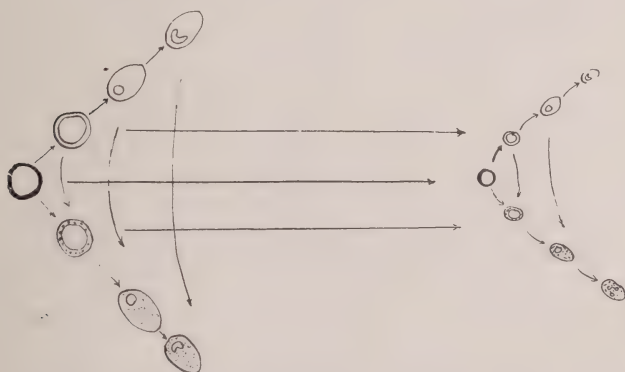
The May-Gruenwald solution is applied for three minutes and then an equal amount of distilled water is added and allowed to remain one minute. This is then poured off and the smear immersed in the Giemsa solution (made by adding 15 drops of the alcoholic solution to 10 c.cm. of distilled water) for fifteen minutes. Wash; dry, but not over a flame.

This procedure stains the nuclei violet. The lymphocytes, monocytes,

the unripe leucoblasts, and the undifferentiated lymphoidocytes have a delicate light blue cytoplasm, often with gleaming purplish-red or dark violet-azure granulation. The 'mast' granulation is ultramarine blue, sometimes metachromatic. The eosinophils have a brick-red granulation, and the neutrophils a rose-colored cytoplasm. The granulation of the latter is, on account of the color nuances, hard to define. True granulated leucocytes, in particular those with oxyplasm, which cannot be classified as eosinophils or mast cells can only be neutrophil cells.

In this connection it is worth while to digest Pappenheim's summary of the chemistry of the white cells:—

Because of their reaction to the various stains the monobasic 'mast' granules can contain only acid carboxyl groups in their protein molecule. The monoxophilic 'alpha' granulation must be a special sort of amphoxyphilic granulation. The granules of the eosinophils seem to be hemoglobin equivalents that develop in lymphoid cells.



Pappenheim's diagram of white cell ontogenesis as printed in Lfg. 1 of his "Atlas" (1905).

The reaction secured by vital staining indicates that the granules must be covered with hulls of a lipid material, probably of a fatty acid nature.

On the matter of the ferments, Pappenheim has shown that the proteolytic ferment of Mueller-Jochmann resides only in cells with neutrophilic granulation. Therefore, it is lacking in fully developed lymphocytes, mast cells, and eosinophils.

In the lymphocytes, on the other hand, a lipase has been found by Bergel. Meyer and Brandenburg have found a peroxydase in the whole granular series. The peroxydase is lacking only in the lymphocytes and normal monocytes. An oxydase has been found in all granular cells and also in their unripe forms. That is, cells with 'epsilon' granules and their predecessors in the myeloid tissue contain an oxydase and a proteolytic ferment, the lymphocytes and monocytes only a lipolytic ferment, and the cells with the 'alpha' granulation oxydase but no lipolytic ferment.

The presence of oxydase does not, therefore, demand also the presence of trypsin.

The significance of the granules is different for the different types. Thus the 'alpha' granules, that is the eosinophil granules, are the result of a secretory process in the cell and probably contain iron, or at least are an equivalent for hemoglobin. The 'epsilon' granules, that is, the neutrophilic, are an intrinsic part of the secretory system of the cell. They develop near the poles of the cell first and go through a whole course of ripening. That is, the 'epsilon' granules are simply a changed form of the paraplasma, while the alpha granules are the products of the



Lymphoid Cells



Lymphocytes

Diagrammatic representation of the development of nuclear polymorphism according to DeCastello and Krjukoff.

paraplasma. The 'epsilon' granules are the morphological expression of a proteolytic ferment, while the 'alpha' granules are oxydizing catalyzers.

The gamma granules of the mast cells are signs of degeneration and seem to be simply lifeless ballast.

The azure granules of the lymphoid cells are minute masses of an internal secretion. They are, therefore, transient, and an expression of cellular activity.

All the leucocytes are ameboid. The granular cells are the most active, the lymphocytes the least so. The movement depends (according

to Loeb) upon a partial lipolytic digestion and saponification of the cell membrane with the subsequent restitution. The process is checked by narcotics.

The granular cells are all phagocytes. The ripe forms are the most active. The small lymphocytes have not been shown to be phagocytic. The large monocytes are called macrophags, the granular leucocytes, microphags. The mononuclear macrophags have a special affinity for cellular structures such as degenerated or dead erythrocytes, polynuclear leucocytes, spermatozoa, Leishman-Donovan parasites, etc. (but not the malaria parasites). The microphags are particularly bacteriophagic.

* * * * * * * *

The solution of the problem of the structure of the white blood-cell was advanced quite materially by the studies of DeCastello and Krjukoff. This contribution would throw some doubt on the conclusions of Nægeli as to the presence of nucleoli as a characteristic of some of the cell types, and also on the prevailing notion as to the constitution of the protoplasmic granules. On the other hand, the studies are rather more, than less, favorable to Pappenheim.

October 18th, 1910, DeCastello and Krjukoff laid before the Imperial Academy of Sciences in Vienna the results of their study* of the structure of the blood-cell—a study pursued under the Wedl fund of the Academy.

DeCastello and Krjukoff used the panoptic stains: the May-Gruenwald and the Giemsa. Their studies were made under gas-light and with a magnification up to 3,000 diameters.

The results of their studies were such that they believe the blood-cell to be made up of coils of threads and that these threads extend through both the nucleus and cell body. That is, that cell and nucleus are structurally one and the same. In any given cell the threads seem of uniform size. They are arranged in arches (*Arkaden*) in such a way that the convexity is always at the periphery and the limbs or straighter portions extend into the nucleus.

The ordinary conception of histologists is that the skeleton of the cell nucleus consists of a network of the finest scarcely stainable threads, in the meshes of which is deposited in various places a very sharply stainable substance, chromatin. In the other meshes there is supposed to be the 'nuclear juice' (*Kernsaft*). The chromatin is in the form of small balls or masses, arranged differently in different cells, so that now coarse granules predominate, now very delicate specks, and again only husk-like collections on the outside of the nucleus. Heidenhain goes even further and separates a basic from an oxychromatin, according to the tinctorial reactions.

DeCastello and Krjukoff, on the contrary, found no masses of material

*Urban and Schwarzenberg. 1911.

lying in the meshes of the threads; rather, they found that the threads themselves took the stain. The clumps were simply the places where several threads lay so close together that the stain thereby became deeper, or the material inside the threads had run into a ball.

They could not find any nuclear membrane. The nucleus is then only the central mass of threads, and it changes its form and tinctorial character according to the age and vitality of the cell elements. This was their conclusion also with regard to the nucleolus: At best the dark masses, called by some histologists the nucleoli, were but spaces between the nuclear threads in which the caryogenetic arches were to be seen.

Similarly in the cell body, DeCastello and Krjukoff found not two substances but only one: a skeleton of threads that extended into the nucleus. Whether there are two types of threads (one belonging to the cell body that divides to make two daughter cells and the other developed caryogenetically by the daughter cells) or only one, the authors did not decide.

The granules apparently develop by the breaking (by pressure or chemical means) of caryogenetic fibres and the broken ends swelling out with the tinctorial substances contained in the fibres. Even in unbroken fibres the collection of the tinctorial substances in balls or clumps could be seen. Thus in eosinophilic cells one can trace the colorless threads between the granules, so also to a lesser extent in the other types of cells.

As to the significance of the different colored granules, DeCastello and Krjukoff found different colored granules in the same cell. Furthermore, they believe that the azure granules and blue-violet granules are only preliminary stages of the so-called neutrophilic granule. "When we grant that the neutrophilic and azurophilic substance so develops that the stainable substance of the caryogenetic fibres loses one or the other component part of its coloring matter and that which remains is thickened into a granule, then we understand how, in the irregularity of this process, there can arise in the course of one fibre granules of similar but easily differentiated color. But this does not necessitate a belief in the transition of one form of granulation into another.

"The transition of the originally compact appearing coils of nuclear fibres into the divided polymorphonuclear forms takes place not through a force working from the outside to model the nucleus, but through a force residing within each nucleus itself which leads to the development of its bundles of threads into one long uniform nuclear rod or convolution (*Stab*). That is, the compact coils of the large mononuclear cells are loosened, then gathered into bundles of uniform size that may be arranged in the different ways in which we find the nuclei of polymorphonuclears."

Thus we see that these authors would support Pappenheim's contentions that the mononuclear cells are the progenitors of the polymorphonuclears, and that the age of the cell may be estimated by the compactness and circularity of its nuclear coils.

And, by the way, the blood platelets are derived, according to these authors, from the cytoplasm of leucocytes and differ in structure according to the type and age of the cell from which they are pinched off.

As a deduction from the articles quoted above we may conclude that the Germans feel that they are reaching something like an agreement as to the technique of blood-staining and also as to the origin, relation and significance of the various white cell forms. It remains to be seen whether American clinicians will adopt the combined panoptic May-Gruenwald-Giemsa stain, and allow it to displace the simpler Wright procedure now in general vogue. In favor of the change is the fact that with it would come a better understanding of the international literature and a more rapid progress in the scientific interpretation of our blood-counts. Against the change is the increased care and time necessary to secure good results—an argument which should not count when results are at stake.

The work of DeCastello and Krjukoff shows also that the staining reaction of the white cells is not without meaning. Chemical changes in the blood—changes too fine to be noted by clinical means—so affect the chromatin that the reaction with a uniform staining procedure differs from the normal. If now we tabulate these changes as we do already the numerical alterations, we shall have a more complete picture of the effect of the various diseases on the blood than we can ever obtain from the present morphological study. This has been made clear to the writer even in the use of the Wright stain, for autointoxications certainly do present an altered color scheme from that of normal individuals.

Finally, we hope that we shall soon have in English an atlas based on the panoptic stain. The nearest that we now have is the translation of Schleip's. The German version of Meyer's "Atlas" is also an approximation. But even in these two atlases too much attention is given to obsolete technique.

THE PROBLEM OF THE OCCIPITOPOSTERIOR POSITION.

By GEO. C. MOSHER, A. M., M. D., of Kansas City, Mo.,
Obstetrician for the German Hospital and the General Hospital.

In a series of 20 successive cases of labor recently attended, 16 were diagnosed right occipitoposterior; and of the 16, the subsequent delivery of the fetus after a long and tedious labor attended with great maternal suffering, frequently requiring assistance, demonstrated the correctness of the original diagnosis.

It occurred to the writer that so large a number of these cases coming up in sequence constituted an object lesson which is worthy of being marked. Beyond a doubt, the right occipitoposterior is one of the greatest *bêtes noires* of obstetrics and a subject which is never too much discussed nor too well understood.

A number of years ago Dr. W. L. Richardson, at that time professor of obstetrics at Harvard, told the story of a consultation, each doctor vainly tugging on the forceps in turn, and, finally after hours of effort, the nurse discreetly withdrawing the sheet and discovering the cause of the delay when the dead baby, to the surprise of all, was dragged into the world, face uppermost, through a badly lacerated perineum, at which the consultants became very busy explaining how it was perfectly clear all the time what was the matter. Richardson was in a sarcastic mood, and his criticism, though not always deserved, made his story most effective, for the picture is one which we have all, unfortunately, witnessed not only once, but too often, in cases of lingering labor. One of the recent writers goes to the limit of charging that any loss of infant life in delivery is the fault of the operator; that if in any case there is difficulty, vaginal or cesarian section should be elected. This is, of course, an extreme and unreasonable statement.

Herman makes a careful division of the occipitoposterior cases into two groups. (1) *Bregmatocotylod*, in which the flexion is good. The bregma or anterior fontanelle lies opposite the acetabulum. The diameter of the presenting part is $3\frac{3}{4}$ in. In these cases, which are the favorable ones, and by far the more numerous, the rotation will always be completed if time enough is allowed, without interference. (2) *Frontocotylod*, in which flexion is defective, so that the frontal eminence rather than the anterior fontanelle is opposite the acetabulum. The diameter of the presenting part is $4\frac{1}{2}$ in. In this variety, which is not so frequently met, conditions are not favorable, and the occiput is more often persistently posterior. It is to be borne in mind that a normal-sized head entering a normal-sized pelvis, occiput to the rear, provided

flexion is complete and the necessary forces that enter into normal descent—flexion, rotation and expulsion—are present, labor in the majority of cases will terminate in a spontaneous normal delivery with no further difference from a left occipito-anterior case than a slight increase in the length of the labor.*

Just what causes the difference in flexion is a matter of a theory of ingenious speculation, according to the appreciation of the laws of physics by each investigator. Being thus of questionable authority, these opinions are not of much practical help. However, since the normal mechanism of labor depends on the nice adjustment of so many factors, posterior position becomes the most frequent cause of delayed labor. Owing to this fact, the infant mortality is raised from the usual 4 per cent. to 10 per cent. The necessity for interference on the part of the attendant is imperative at least in 10 per cent of all posterior positions.

While some authors do not lay so much stress on the condition of the membranes, the writer has, in another paper, said that the preservation of the membranes intact is the *sine qua non* in all posterior labors. His subsequent experience, both in private and hospital practice, emphasizes this conclusion as being founded on facts.

The function of the bag of waters is first as a dilator of the cervix; secondly, it acts to stimulate contractions of the uterus by reflex; thirdly, most important of all, is the impetus it furnishes to the rotation of the head.

The relation between faulty flexion, incomplete rotation and the condition of the membranes is so close that, in case of premature rupture of the sac, slow, inefficient labor, suffering constantly increasing, especially marked in the back, tardy dilatation of the cervix and early exhaustion of the patient's strength, one is justified, even in the absence of the clinical examination by palpation, auscultation, and the vaginal touch, in making a provisional diagnosis of posterior position.

The vertex presentation is generally estimated at 96 per cent. of all cases. There is some difference of opinion as to the relative proportion of these cases, which are originally anterior, as frequently the posterior case becomes anterior by rotation before it is examined. It is perhaps safe to say that in 85 per cent. of all the vertex cases the head will be found entering the pelvis in the right oblique, because of the fact that the rectum occupies a portion of the left oblique, thus accounting for the natural right obliquity of the uterus, which invites the presenting part to the right oblique. Authors say that the relative proportion of cases which descend with the back to the mother's abdomen are about 65 or 70 per cent., while 30 to 35 per cent. enter with the occiput posterior. The larger percentage of anterior positions, according to the old textbook law, is that the attitude of the fetus is constantly adjusted to keep in relation its shortest possible diameter with the largest possible diameter of the maternal pelvis.

*Rice (*Amer. Journ. Obstet.*, Vol. LXVI, p. 232).

The frequent reference to these well-known facts is only excusable on the ground that we are so prone to forget rules and definitions. The rotation of the head to bring the occiput anterior in a left occipito-anterior is through 45° , while in a right occipitoposterior it is 135° . This increased rotation does not take so long a time as it might appear, since in the majority of cases there is a mechanical adjustment between the firm resistance below and the forces of the uterine contractions above. Flexion is thus preserved and the descent and rotation constantly invited. It can be easily seen that, with the membranes drained of the amniotic fluid, this balance is disturbed, the adjustment lost, and the reciprocal relation between the resistance and the force destroyed.

In the Manhattan Hospital, Rice reports that in 1,000 normal labors the membranes were found intact in 60 per cent. In 400 cases of right occipitoposterior, the membranes were found intact only in 43 per cent. The records showed that in posterior cases early rupture of membranes were more common in primiparæ. In 80 cases of multiparæ, only 33 or 41 per cent. of premature ruptured early.

Quoting again from Rice, in 1,000 left occipito-anterior cases the length of labor was, for the first stage, fourteen hours and ten minutes, and for the second stage, one hour and thirty minutes in primiparæ; while in 400 cases of occipitoposterior in primiparæ, the first stage was sixteen hours and thirty minutes, the second stage two hours and ten minutes—a difference of two hours and twenty minutes in the first stage and forty minutes in the second stage. In multiparæ, in the occipito-anterior position, the first stage of labor was eight hours and thirty minutes, the second stage one hour and eleven minutes. Multiparæ in occipitoposterior positions: first stage, eleven hours and thirty minutes, second stage one hour and forty minutes—a difference of three hours and ten minutes in the first stage and twenty-nine minutes in the second. Two of the causes for the increase in length of labor are the increased diameter of the head, which has to rotate, and also the prolongation of the stage of dilatation of the cervix, owing to the fact that only the vertex with the head anterior makes a perfect dilator, acting through the hydrostatic pressure of the intact bag of water.

In the posterior position not only is this wedge lost after rupture of the membranes, but also the relation of the head to the pelvic inlet is disturbed; and the force of contraction of the uterus, which is not directed to the axis of the cervical canal, is diverted and dissipated. In cases of multiparæ the loss of the firm perineal floor, as a means of resistance to direct the descending head, prolongs labor, because of there being no aid to prompt rotation which the firm muscular floor would have afforded.

Von Weiss* found that in 41 per cent. of right occipitoposterior cases, the average size of the head was less than normal. From this Kerr argues that a relatively large pelvis or small head invites to right occipitoposterior.

**Klin. Vortraege*, No. 60, 1892.

That there is some relation between cause and effect is shown by the fact that in three deliveries in succession in the same patient, the writer has had the right occipitoposterior position to occur.

The importance of an early diagnosis cannot be overestimated, because the efforts of the accoucheur must be directed definitely to two essential points—that of preserving the membranes and also of encouraging flexure.

It is no longer necessary to urge the necessity of an intelligent diagnosis of position and presentation, as all now appreciate it. The writer remembers that, some years ago in a discussion of his paper on Diagnosis by Auscultation and Palpation, one of the participants said it was all very well for obstetricians to look for position and presentation, but that the general practitioner was satisfied to know if the child was coming head first or breech first, and he was not always sure of that much in the diagnosis. That statement is now a matter of ancient history, and no longer obtains, and to-day our students are taught the methods of examination by frequent bedside drill; hence, they become familiar with the various landmarks of obstetric diagnosis. However, in right occipitoposterior cases it is not always easy to make a diagnosis. The striking things to remember are that the breech is found in the fundus and the head at the brim, but instead of the broad back extending between, there is a hollow, into which the fingers dip, between the two, and frequently the small parts can be made out in this hollow. Usually the back can be made out in one flank, but not definitely. By Paulik's grip, the head is located at the inlet, fixed, but with partial flexion; the occiput and forehead being felt with equal ease (Tweedy). The facility of palpating limbs in front, the presence of the back on the right side, and the depression between the two poles, should always lead to the suspicion of occipitoposterior position. The diagnosis is made more certain by a vaginal examination. The ease with which the anterior fontanelle is felt because of the faulty flexion is a striking characteristic of this position. Both fontanelles can be felt, and if the small fontanelle is to the right and posterior, the diagnosis can be safely given as occipitoposterior. Tweedy calls attention to another feature, which is that the presenting part is crowded to the front against the pubic arch while there is plenty of room between the head and the sacrum. As the case progresses, rotation advancing, the posterior fontanelle should become easier of access, the anterior more difficult to reach. In case the anterior becomes more easily reached, it shows that extension is taking place and that the probability is that the occiput is about to rotate into the hollow of the sacrum. It then becomes a persistent face to pubes, or difficult occipitoposterior position.

Various authors ascribe the frequency of this as between two and seven per cent., the latter being the statistics of Kerr. The dangers of deep lacerations of the soft parts, exhaustion of the mother, and the increased fetal mortality already mentioned must always be borne in mind.

Suppose the diagnosis of occipitoposterior position is made, what is the treatment? In the language of our distinguished obstetrician of the last century, Charles D. Meigs, try letting it alone. "Beware of meddling midwifery!" said Meigs, "and if one is to err in these cases better err on the side of waiting." By far the greater damage is done by indiscreet attempts to do something, courting the disaster of early rupture of the membranes, and thus disturbing Nature's method of rotation to the anterior. Forceps have been put on prematurely and much traumatic injury done the mother; and many children have been unnecessarily sacrificed by this injudicious interference.

Let us go back to the classification of Herman. If we can make out into which of Herman's groups the case should be placed, our duty is much plainer. Hence, in the properly selected case, good flexion gives a head diameter of $3\frac{3}{4}$ in., and the method is to await the advent of dilatation, rotation, and descent. When the pains are strong, no treatment is necessary, as a rule, if other conditions are favorable. When the maternal pulse and temperature are not over 100, and the child is in no apparent distress, the case should be left alone.

In the second class where pains are weak and irregular, and the occipitofrontal diameter of $4\frac{1}{2}$ in. has to be considered, interference is generally to be expected, because as a rule the patient becomes exhausted and is unable to deliver herself unassisted.

In the early part of the first stage Kerr advises chloral or morphine. Tweedy gives—

Sod. Brom.	
Chloral Hydrate ana.....	gr. xv
Tinct. opii.	m xv
Aqua q. s.....	ʒi

Thus in this stage there is little variation between the practice of these great teachers and our own methods.

Quinine, strychnia or other alleged uterine stimulants will be found to be only shaky reeds, and should not be trusted in a case requiring scientific treatment.

In the matter of manual rotation there is a wide difference of opinion. The writer has been very partial to this procedure since reading the paper of his former assistant at the Kansas City Medical College, Dr. Junius A. Rawlings. Rawlings in a long series of cases had uniform success in the manual rotation of the head. This is accomplished by first making a careful diagnosis of the position, so that the manipulation can be intelligently adopted. Of course, it can only be advised in the second stage, with dilatation to admit the thumb and two fingers, the other hand being pressed against the abdomen, so as to bring the anterior shoulder forward, thus aiding the manœuvre, without which assistance the effort will fail. In any case manual rotation must include the shoulders, in order to prevent the slipping back of the head as soon as the hold is released.

Manual rotation has had the endorsement of many of the modern schools of British obstetricians, Herman, Jardine and Kerr. Tweedy does not recommend it. In his experience, if it is possible to rotate by hand, the maternal powers, if soothed and strengthened by a rest, will be ample to accomplish the same result. If not, he believes the forceps the only alternative, calling attention to the larger occipitofrontal diameter, $4\frac{1}{2}$ in., which has to pass the vaginal outlet; and he cautions against deep laceration by the head suddenly and unexpectedly slipping out, which accident he avoids by lessening traction as the occiput comes over the perineum. Rotation of the head by forceps and then reapplying after the rotation is complete has been endorsed by Tarnier, Edgar and other authorities. Rotation will sometimes follow application of axis traction forceps, and the same method may be used to effect the delivery. The use of version is applicable in those cases where full dilatation of the cervix is obtained and the head freely movable.

Finally, in those cases where persistent occipitoposterior position results, forceps may be applied and the head drawn over the perineum face to pubes, resulting usually in deep maternal lacerations and often some mutilation of the child's head, but the injury is generally superficial, unless the head be so closely approximated that the pressure on the fetal cranium produces some grave lesion. However, the last resort must now be tried, and even if desperate chances are taken there is no alternative but cesarian section.

The landmarks to be kept in the limelight are: (*a*) Make an accurate diagnosis; (*b*) always preserve the membranes; (*c*) in first stage no treatment, if patient is in good condition, for over 90 per cent. have spontaneous rotation; (*d*) the great desideratum is to encourage good flexion, good pains; (*e*) in second stage with weak pains try first chloral and morphine (Tweedy's plan); (*f*) manual rotation has resulted in many safe deliveries; (*g*) if head is not engaged, version may be indicated; (*h*) rotation by forceps and reapplication is recommended by New York obstetricians; (*i*) in 2 per cent. of these cases the head must be delivered posteriorly and deep lacerations are to be expected; (*j*) it is predicted that cesarian section will more frequently be selected after the patient has been given the test of labor, and the attempt found unsuccessful.

THE PRACTICAL LOCAL TREATMENT OF FURUNCLE.

By DONALD MACFARLAN, M. D., of Philadelphia.

The illustrious Duke of Wellington once said that he "spoke French with intrepidity." This rather naïve remark applies admirably as far as the French language goes, and in fact comports well with the management of many other matters, but it is sadly out of place in one respect—as far as the local treatment of furuncle is concerned. To boldly incise a furuncle or common boil 'in the making' is certainly to court a train of very disastrous consequences. By so doing one subjects his blindly confiding charge to many unnecessary dressings and at the same time in no way hastens a speedy cure. In the formative stage the involved area is well below par as far as local resistance is concerned, and heedlessly to traumatize at this time is quite an unnecessary blunder.

The signs pointing to this formative state are always more or less definite in type and should guide one along lines which are conservative as well as best for the patient. This applies most strongly whenever one has to deal with the local lesion on an important exposed area such as the face. A patient, in a typical case, will seek treatment for what he first thought was only an ordinary pimple, of rather an annoying kind. After a few days, he has doubts on this score, however, as a circumscribed reddening has set in with some swelling and induration. The part seems very itchy as well. In reality the seat of the trouble is very painful and troublesome. It burns sharply when rubbed over. With such a history we should realize at once what we are dealing with. At this time, it seems best to apply an ample and well-warmed poultice of bread and milk to which has been added a small amount of yeast. The poultice should not be made too warm, as this will kill the yeast. This is very important, as the yeast sharply limits the infiltration and brings about the desired pointing. Poultices should be changed thrice daily. After several days of this poulticing, during which time the general health has been cared for and improved, the area of abscess is well delimited, and it is at this time that a recourse to incising should be made.

A crucial incision is then done—the strokes meeting at the core. This is removed and the boil contents thoroughly expressed. After this the wound is swabbed and cleaned and then syringed with potassium mercuric iodide solution in 1:2000 strength. This very soluble salt of mercury is easily obtained by dissolving the red iodide of mercury in an aqueous solution of potassium iodide. It is more highly antiseptic than the rather corrosive bichloride of mercury and facilitates healing by primary intention. In the subsequent dressings a wet dressing of the same solution may be used and it will be found very efficacious, indeed. A light roller bandage is of course required to complete the dressing which must not be applied to tightly.

TWO CASES OF MULTIPLE METASTATIC BONE CARCINOMA ORIGINATING IN SCIRRHUS OF THE BREAST.

By G. H. STOVER, M. D., of Denver.

On November 29th, 1910, the writer was requested to go to the residence of Mrs. J. F. and make a roentgenographic examination of her spine, the attending physician stating that she had chronic osteo-arthritis, and was in such condition that she could not be brought to his laboratory.

He found a patient over sixty years of age, in bed. She could be moved into a chair, but was compelled to remain in bed most of the time. As she and the others of the family were radical Christian Scientists, it was difficult to elicit a statement of history or symptoms, as they were all averse from having such things "held in thought," but he learned that she had had pain and stiffness in the back for some time. He discovered incidentally that both breasts were shrunken, composed of irregular hard masses, the skin deeply infolded, the nipples retracted and inverted. This condition had begun many years previously, first in the right breast, and appearing in the left some time later; he considered this to be a scirrhus without doubt, though it had not been recognized as such by other clinicians, and many had been in attendance.

The writer's roentgenograms showed a multiplicity of lesions; these were seen in several ribs, the scapular heads, clavicles, and in the transverse process of at least one vertebra; the individual lesion was a hiatus in the bone structure, usually a single celled cavity, but in the heads of the scapulæ near the glenoid rims there were several close together; they were $\frac{1}{8}$ in. and upward in diameter, rather irregularly outlined; there was no periosteal thickening; no eburnation; no deformity in the cortex of the bone except in the fifth rib on the right where a spontaneous fracture seemed to have occurred; here there were signs of cortical thickening as if there had been an attempt at repair; there was a mass about the size of a pigeon's egg at the left side of the middle mediastinum, probably a diseased lymphatic gland. He was not permitted to make further roentgenograms, so cannot speak of the conditions in other bones.

On inquiry (July, 1913) he learns that this patient is still living, and is in much the same physical condition as at the time he saw her, but is now entirely confined to bed.

On June 18th, 1913, he was requested to examine the right humerus of Mrs. B., a patient in the orthopedic department of the County Hospital. He was told that she had been an inmate of the hospital for some time, with a diagnosis of spinal osteo-arthritis. He found a woman aged forty-eight who had been confined to bed for a number of months on account

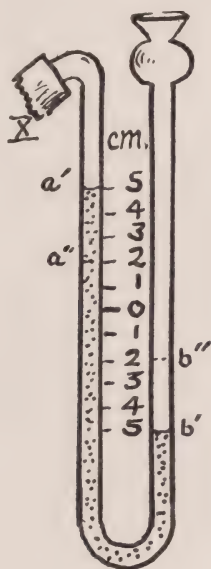
of pain and stiffness in the back, beginning in the cervical region; she had complained of a suddenly appearing, severe pain in her right arm following the moderate muscular effort required to pull up the bed-clothes. He did nothing but make a roentgenogram of the right humerus at that time. When he inspected this roentgenogram he found a spontaneous fracture in a typical carcinomatous area in the shaft of the bone; he sent in the diagnosis as such, writing that if an examination of the patient's breasts was made, scirrhus carcinoma would undoubtedly be found. The staff physician reported to him on the following day that this peculiarly made diagnosis was correct, the patient having a scirrhus which had first appeared eight years ago, and which in one breast was about to ulcerate.

He then made a further study of the case, with the following findings: Multiple cellular defects in clavicles, scapulæ, humeri, vertebræ, os innominati, trochanteric region of femora, and in shaft of left femur, all typical lesions of bone carcinoma. Other bones were not examined.

HOW TO READ THE PNEUMOTHORAX MANOMETER.

By EDWARD VON ADELUNG, M. S., M. D., of Oakland, Cal.

Now that the value of artificial pneumothorax in the treatment of pulmonary tuberculosis is being generally recognized, it is of considerable importance that the records of different observers should be easily understood by their readers. All workers in this field agree that the manometer is an essential part of the apparatus and that it is absolutely es-



MANOMETER

sential to a proper estimation of intrathoracic pressures. Under these circumstances it is somewhat surprising to note that various workers are reading and recording their manometers differently; hence, one is at a loss to know what a writer means by his figures at the present time. To make his meaning clearer, the writer will take an illustrative example.

The ordinary manometer is depicted in the illustration, being simply an ordinary U glass tube, filled with water to zero. Thoracic pressures are transmitted through tube X and depress (positive pressure) or 'suck up' (negative pressure) the fluid. If the pressure varies as during breathing, of course the columns will oscillate. For example, the left column under negative pressure oscillates from a' to a'' , and simultaneously

the right oscillates from b' to b'' . During breathing they are in constant motion. Now the question answered so variously is, how should the manometer be read?

Should one read in this case negative pressure 5, the top figure to which the left column rises; or 2, the lowest mark above zero that it reaches; or 10, the difference between the tops of the two columns when they are at their maxima; or 4, the difference between them when they are at their minima; or should one read the mean, the figure in the middle of the space covered by the oscillations between the maximum and the minimum on one side of the manometer—in this case 3.5; or, finally, should this figure be doubled making the reading 7, the *mean pressure*?

Such is the confusion of possibilities that presents itself to some minds.

Of course, there can be but one correct reading. Physics has long ago made clear that the pressure is measured by the column of fluid supported. Now the column supported is that portion of the longer column above the top of the shorter. The correct maximum reading in the given example is, therefore, negative 10, while the correct minimum reading is negative 4.

But under these conditions some would read maxima and some would read minima. So we still have something to agree on. *It is here suggested that mean pressures be recorded.* In this example the *mean pressure* is negative 7.

MEDICAL AND SURGICAL PROGRESS.

OPERATIVE INDICATIONS IN DIABETES.

A REVIEW OF RECENT LITERATURE.

By M. G. SEELIG, M. D., of the Editorial Staff.

1. Becker: Danger of Narcosis in Diabetes. (*Deutsch. med. Wochenschr.*, p. 359, 1894.)
2. Da Costa: The Resistance of Diabetes to Bacterial Infection. (*Amer. Journ. Med. Sciences*, No. 3, 1909.)
3. Fueths: Diabetes Mellitus and Gynecological Operations. (*Deutsch. med. Wochenschr.*, p. 65, 1903.)
4. Handmann: The Causes of the Lowered Resistance of Diabetics to Infection. (*Deutsch. Archiv fuer klin. Med.*, Bd. 2, Hft. 2, p. 480.)
5. Joslin: My Experience with Diabetic Patients. (*Journ. Amer. Med. Assoc.*, p. 933, September 21st, 1913.)
6. Karewski: Reciprocal Action Between Diabetes and Surgical Operations. (*Berl. klin. Wochenschr.*, Nos. 10, 11, 12, 1905.)
7. Kaposi: Diabetes and Surgery. (*Ergebnisse der Chir.*, Bd. 6, p. 52, 1913.)
8. Kausch: Diabetes in Surgery. (*Zentralbl. fuer Chir.*, p. 46, 1902; *Archiv fuer klin. Chir.*, Bd. 24, Hft. 4.)
9. Lepine: Les Complications des Diabètes. Baillière et Fils, Paris, 1906.
10. Manges: The Disappearance of Sugar after the Removal of Tumors in Diabetes. (*Journ. Amer. Med. Assoc.*, No. 9, p. 661, 1913.)
11. Morris: Diabetes in Surgery. (*Med. News*, June 29th, 1901.)
12. Murphy: Cholecystitis. (*Surgical Clinics*, Vol. 2, No. 3, p. 491, 1913.)
13. Sternberg (Quoted by Kaposi).
14. Wolf: Gangrene in Diabetes and Its Treatment. (*Zentralbl. fuer die Grenzgeb. der Med. und Chir.*, No. 4, p. 21.)

For years it was generally assumed that a diabetic patient was, by the very nature of things, a poor operative risk; this assumption was supported by the fact that in diabetics, intercurrent surgical disease—such as furuncle, carbuncle, or gangrene—was recognized always as of serious import. After asepsis became a principle of surgery, more and more successful surgical attacks were made in the presence of diabetes, until finally, within very late times, the dictum has gone forth that one should

not consider diabetes as a serious contraindication to surgical interference. It should be said at the very outset, regarding so radical a statement as this, that any surgeon, however careful he may be in asepsis, however skilful he may be in technique, who does not reckon with diabetes as a treacherous force for postoperative evil, is sure to come to grief.

It is remarkable, considering the essential importance of the subject, how scanty are the citations in literature. In the writer's own index to surgical literature, he has recorded only about ten titles bearing upon diabetes in its relation to setting operative indications; and in a recent complete résumé of the literature by Kaposi, there are only about one hundred references, covering a period of over a quarter of a century. Such being the case, it is all the more important that we should become as accurately oriented as possible. It is essential to be able to judge, in a measure at least, the worth of a statement such as the one made by Sternberg: "Any necessary operation may be performed with safety on a diabetic," and the counter proposition made by Lepine: "Every operation is contraindicated in a diabetic." In order to form a judgment, however, it is necessary to realize at the start that we should not consider diabetes as a simple entity, connoting merely an output of sugar in the urine. The quantity of sugar, its persistence, the variations in output dependent upon diet, the presence of diacetic acid or acetone, accompanying cardiovascular disease, are all factors of supreme importance.

Strange as it may seem, many cases of diabetes are not so diagnosed, even despite careful urine examinations. The following case history serves well to illustrate this type of diagnostic pitfalls:—

Mrs. X, multipara, Jewess, *æt.* fifty-five, of very corpulent habitus, suffered with multiple erythritic ulcers of the vagina. She had been treated without avail for months and was finally advised to have an extensive vaginal plastic operation performed. At this she demurred; discontinued treatment. After a few weeks, she consulted the writer, announcing her visit with the statement that she felt herself on the verge of suicide. Her corpulency, ancestry, mode of life, and the appearance of the ulcers suggested a diabetic etiology. The urine, however, showed no trace of sugar. On six successive days, a specimen of the twenty-four-hour urine showed no sugar; but on the seventh day, there was a 5 per cent. sugar content. On a proper regimen the ulcers healed promptly.

An extensive vaginal denudation on a patient of this type, in all probability, would have resulted disastrously. Fueths quotes several similar cases from surgical literature and Kaposi cites an analogous case, in which instance he operated, the patient dying of coma in twenty-four hours. It is important, therefore, to recognize the fact that, in any instance, if the anamnesis or general physical examination furnishes any suggestive evidence of diabetes, one must not rest content with a single examination of the urine. It is wise, in such instances, after repeated negative findings, to test the sugar tolerance before advising operation.

Let us assume that sugar has been found in the urine of a patient with a surgical ailment. What principles should govern us in advising the patient regarding surgical interference? First, the principle that the operative result is almost directly dependent upon the grade of diabetes. Von Noorden classifies diabetes into the mild, moderately severe, and severe grades. Under the mild types he groups those cases in which the sugar excretion ceases after simply excluding the carbohydrates from the diet. The moderately severe cases continue to excrete sugar after

the carbohydrates are withdrawn, but become sugar-free after the nitrogen intake is partly restricted. The severe cases continue to excrete sugar even after the carbohydrates are excluded and the nitrogen intake cut down. The presence of acetone bodies in the urine also points to a severe grade of the disease. It must be borne in mind, however, that one cannot estimate the resistance of a diabetic by any rule of thumb. Coma may supervene after an operation performed on a patient suffering with the mildest type of diabetes. It is this fact which prompts Kaposi to quote von Noorden's axiom: "Every diabetic is, emphatically, less resistant to trauma than is a normal patient." Under the term 'trauma' is included, not only the direct operative injury to the tissues, but also the systemic injury resultant from the volatile anesthetics. Becker, in particular, has shown clearly the dangers of anesthetization in diabetics, as he has also pointed out the relation between narcosis and acetonuria. The first principle that we may lay down for ourselves, therefore, is that diabetics, whatever the degree of severity of their disease, are poor operative risks; but that the milder types of the disease permit surgical interference with a greater degree of safety than do the more severe grades.

The second principle to bear in mind is that wound healing is profoundly influenced by diabetes. The two phenomena most often encountered and most dreaded, as postoperative complications in diabetics, are coma and wound infection (severe spreading phlegmons and gangrene). Coma still remains more or less a mystery; but the question of wound infection has been fairly satisfactorily cleared up. In the pre-antiseptic days, diabetes was regarded as an unqualified contraindication to operative interference, owing to the almost inevitable development of phlegmon or gangrene. As the principles of antisepsis were developed and as they, in their turn, were succeeded by the principles of asepsis, operations were undertaken with more and more safety and assurance, until now we know that if every link in the aseptic chain is preserved absolutely intact, wounds in diabetics may heal as quickly as they do in normal individuals. Morris, over ten years ago, emphasized this point by the citation of operative results in diabetics. The trouble and difficulty lie in preserving an intact aseptic chain; for practically all authorities are agreed that when infection does occur in a diabetic, it runs a much more treacherous course than in a normal individual. Karewski, who has contributed probably most substantially to this subject, believes that a small number of cocci which are innocuous ordinarily may cause havoc when they enter a wound in a diabetic.

It is more or less questionable whether the sugar content of the blood is the factor that should be made responsible for the frequency with which diabetics become subjects of purulent and gangrenous inflammation. The work of Handmann proves fairly conclusively that the sugar content of the blood is a factor that indirectly rather than directly favors infection. Handmann believes that tissues, bathed in blood or serum containing sugar, become less resistant than normal tissues. He shows experimentally that Da Costa is wrong in assuming that the blood of diabetics serves as a better culture medium than normal blood, and he further contends that Da Costa is in error in stating that the opsonic index is lowered in diabetics. He calls attention to the significant fact that general sepsis is an uncommon termination of diabetes and sums up his investigations as follow: The growth of staphylococci is the same in diabetic and in non-diabetic blood; the bactericidal property of blood is not influenced by the addition of 1 per cent. of sugar, nor is the opsonic

index influenced; infection results not from hyperglycemia, but from an injury to the cellular elements of the tissue, referable to the circulating sugar. Wolf, in his collective abstract, confirms the conclusion of Handmann. We see, therefore, that our second principle is that in operating upon diabetics we are handling tissues that are compromised as a result of faulty metabolism and therefore possess a more or less pronouncedly lowered resistance.

The third important principle governing our judgment of diabetics as surgical risks is based on the fact that not only the special tissues are compromised, but also that the organism, as a whole, is weakened. The frequency of endarteritis, arteriosclerosis and myocarditis, the frequent neurotrophic disturbances, the not uncommon loss of weight and persistent status of underweight in diabetic patients, and the existence of a coincidental nephritis, all point to the fact that these patients must be considered as special surgical risks, to say the least. It is worth noting at this point, in order to emphasize the complexity of the subject, that not infrequently the development of nephritis in a diabetic is associated with a permanent disappearance of sugar in the urine (Manges). Meltzer has pointed out and emphasized the compensatory phase of physiological processes underlying body functions. He uses the term 'factors of safety' to describe this compensatory mechanism. In diabetes, these various factors are more or less in abeyance or lost, just as they are lost in any other long-standing illness; consequently, it is important for the surgeon to know that many of his allied forces upon which he depends ordinarily with a fair degree of assurance, are not to be counted upon in diabetes. After all, this broad generalization is the all important concept for the surgeon to bear in mind; and it is this type of generalization, undoubtedly, which prompted Kausch to draw the definitely specific conclusion: "Diabetes must always be regarded as a contraindication to operation." If we were in possession of fuller knowledge regarding the exact significance of the acetone bodies, or if we were better oriented in establishing a prognosis regarding the onset of coma, we might be able to classify diabetics into two groups—those who will withstand operative attack and those who will not. As the matter stands, however, in the present state of our knowledge, our judgment regarding operative interference must be governed by the degree of symptomatic imperativeness with which operation is demanded, by the severity of the diabetes, and by the general condition of the patient.

It is, therefore, fundamentally important to hold firmly in mind the fact that, in setting an operative indication for diabetics, we must judge the patient, and not his urine. Just now it is particularly important to hold firmly to this fact, for within the past year there has developed a new line of surgical thought, directed not toward the determination of surgical contraindications in diabetes, but rather toward the surgical amelioration of diabetes. Murphy, Joslin, Miller and Manges have published case histories of diabetics operated upon for inflamed gall-bladders, hypertrophied prostates and uterine fibromata, with the result that a pronounced improvement or a cure of the diabetes resulted. Such a result following operation for chronic gall-bladder or duct disease is easily explained, or the assumption that secondary pancreatitis was the essential factor in the diabetes and that with efficient biliary drainage there was a *restitutio ad integrum* both as regards the pancreatitis and the resultant diabetes. It is more difficult to correlate cause and effect when diabetes disappears after hysterectomy or prostatectomy. Manges admits the possibility of

coincidence, but dismisses the thought at once, and states the most plausible explanation to be that operative interference possibly removes some toxic or nervous irritant which had previously disturbed carbohydrate metabolism. Immediately, on the heels of this hypothesis, Manges speeds the all too optimistic conclusion that "the surgeon has too much fear of acidosis." "When diacetic acid or oxybutyric acid tests are negative," continues Manges, "there is no danger, no matter how intense the acetone reaction may be. Impending coma may be diagnosed by the determination of the reactions of the ammonia nitrogen to the total nitrogen excretion of the urine. When this quotient is low, and within normal limits, the immediate prognosis is good and the danger from coma or grave acidosis after operation is not great enough to prevent the performance of any operation which may be necessary." Such a conclusion, based on four operative results, scarcely seems warranted; certainly, it misses wide the mark of displacing the Hippocratic doctrine of *non nocere*; and despite Manges, we must tread carefully in that field of surgery which has to do with diabetics, even in those instances where our extra caution seems to be unwarranted by laboratory findings.

FLAT FEET.

A REVIEW OF RECENT LITERATURE.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Baisch: The Structure and Mechanism of the Normal Foot and the Flat-Foot. (*Zeitschr. fuer orth. Chir.*, Bd. XXXI, Hft. 1-2, 1913.)
2. Osgood: The Prevention of Foot Strain. (*Boston Med. and Surg. Journ.*, Vol. CLXVIII, No. II, March 13th, 1913.)
3. Brandenstein: Dysbasia Arteriosclerotica and Flat-Foot. (*Berl. klin. Wochenschr.*, Vol. XLIX, No. 43, p. 2027.)
4. Stevens: Cause, Prevention and Care of Weak and Flat Feet. (*New York Med. Journ.*, p. 957, Nov. 9th, 1912.)
5. Baisch: The Redressment of the Contracted Flat-Foot under Local Anesthesia. (*Zentralbl. fuer chir. und mech. Orth.*, June, 1912.)
6. Kirrison: Painful Flat-Foot. (*Rev. d'Orth.*, Nov., 1911.)
7. Mencier: Respective Indications for Physical Methods and Surgical Interference in Painful Flat-Foot. (*Archiv. prov. de chir.*, No. 6, 1911.)
8. Meng: The Rôle of the Long Muscles of the Leg in the Pathology, Prophylaxis and Treatment of Flat-Foot with Special Reference to the Flexor Longus Hallucis Muscle. (*Zeitschr. fuer orth. Chir.*, Bd. XXIX, Heft 3-4, 1911.)
9. Katzenstein: Formation of Artificial Ligament by Transplanting a Periosteal Flap. (*Zentralbl. fuer Chir.*, Vol. XXXIX, p. 169, 1912.)
10. Momberg: Formation of Artificial Ligament in Flat-Foot by Transplantation of Fascia. (*Zentralbl. fuer Chir.*, Vol. XXXIX, p. 346.)

Baisch has made a radiographic study of the normal and abnormal foot, both with and without weight-bearing. This study was systematized by taking a transparent paper tracing of the radiograms and comparing the foot under strain of weight and without the same in its relationship to a common base line. The author thus believes that a diagnosis of flat-foot can be made by the radiogram, and that with weight-bearing there occurs a drawing together of the tarsal and metatarsal bones in the normal foot, while in flat-foot there is a yielding and separation of the bones.

Osgood has studied the relationship that foot strain and muscle balance bear to the position of the feet in the shoes, his material being 369 female college students. He believes that the prevention of foot strain lies in early and proper care of the feet by the use of properly balanced shoes.

Brandenstein points out the well-known fact that there is often a disturbance of the circulation in the limbs associated with flat feet. He

lays emphasis on the fact that flat-foot is always treated and that the circulatory changes are usually neglected. He believes that the importance of the changes in the blood-vessel wall in the consideration of the treatment of flat-foot is of great significance, and that, consequently, insoles often do more harm than good, whereas hot-air treatment, the administration of potassium iodide and digitalis will often produce great improvement.

Baisch, in another article, has found that local anesthesia can be used for the manipulation of the contracted foot. He injects cocaine around the tibial and peroneal nerves, high up between the biceps and semi-membranosus. This produces, after a few moments, complete local anesthesia, loss of muscle sensation and relaxation of the rigid muscles, thus making correction easy. A plaster-of-Paris cast is applied for one week, followed by baking and massage. At night a Huebscher splint is worn.

Stevens has studied the size and shape and quality of the sole of the foot with reference to its resiliency, need, office and effectiveness. He believes that there is need of a cushion under the foot and that the sole furnishes this office. This is necessary in order that the foot may be used on uneven ground, where the middle of the foot may have to bear as much weight as the heel or ball. The outer half and middle of the sole are intended to bear weight all the time, and he points out that thus the shank of the shoe is its greatest physiological defect. He suggests that heels should not be worn and that the shank of the shoe had better be filled in solid, so as to give support to the sole and prevent foot strain.

Kirmisson discusses the question of painful flat-foot as being due to a purely mechanical origin and combats the argument of Poncet that there is ever a tuberculous nature to this condition. He believes there are two anatomical types of painful flat-foot: In one, which is seen chiefly in adolescents of large stature, the foot is large, lean and muscularly weak, and in the other the foot is small, thick and fat. Pain is due to ligamentous stretching in the tarsus. This induces bony alterations both in shape and structure. Treatment consists of employing an adduction shoe furnished with a stiff internal counter and with the sole and heel raised on the inner border. He prefers Ogston's operation in the extreme cases which resist other methods of treatment.

Mencier advances four theories as to the cause of flat-foot: The muscular theory, the ligamentous theory, the osseous theory, and the articular theory. The muscular and ligamentous tissues become a factor when they cannot support the superimposed weight; they give way and allow the foot to come down. Cases become osseous when there is a change in the bearing of one bone upon another. Articular cases are due either to a primary or secondary arthritis. He uses plates or exercises combined in the usual routine way, and prefers the Whitman plate. For rigid flat-foot he remodels the astragalus by cutting into the body of the bone without disturbing its articular surface. He then over-corrects the foot and holds it in a well-fitting plaster boot for two months, with the patient bearing weight on it. When this is removed, physical methods are again applied. In all cases he feels that a strict training in walking, mechanotherapy and other exercises are very essential to the success of treatment.

Meng, in a number of observations upon the strength of the various long muscles of the leg in flat feet, verifies the findings of Huebscher, which were, that the long flexor hallucis was the muscle most atrophied

and weakened in flat feet. He points out that this muscle particularly should be strengthened.

Momberg and Katzenstein both suggest operative treatment in certain cases. Katzenstein reports one case of traumatic flat-foot where there was laceration of the ligamentum tibio naviculare, with a luxation of the calcaneonavicular joint. Here he took a periosteal flap obtained elsewhere and folded it upon itself, joining it to the internal malleolus and to the navicular.

Momberg describes a similar operation, in which he used a fascial transplant from the fascia lata. He criticises the operation of Katzenstein and suggests that fascia is more suitable for the purpose.

DIAGNOSTIC AND THERAPEUTIC NOTES.

SCLEROSIS OF THE PULMONARY ARTERY.—Arrillaga (*Archives des malad. du cœur, des vaisseaux et du sang*, No. 8, 1913). In a valuable and interesting paper, Arrillaga, of Buenos Ayres, discusses this important cardiac lesion which has hitherto been somewhat neglected by clinicians. It arises as the result of the coincidence of two conditions. Some chronic pulmonary affection, tuberculosis, bronchiectasis, asthma or chronic bronchitis, leading eventually to an emphysema, has produced a condition of permanent hypertension in the pulmonic circulation. If, in addition, some toxic agent, lead, alcohol, malaria and, above all, syphilis has led to a pulmonary endarteritis, a sclerosis of the pulmonary aorta will result, analogous in many ways to aortic sclerosis. It imposes an abnormal load upon the right heart and leads to an enlargement of the latter and to a dilatation of the pulmonic aorta. This cannot readily be made out on percussion but is clearly demonstrable by means of the x-ray. Otherwise, examination of the chest shows only the usual signs of pulmonary emphysema. The most striking feature of the patient is an extreme and permanent cyanosis, due to the embarrassment of the lesser circulation. There is usually considerable dyspnea on exertion but no other evidence of heart failure, no edema, no jugular distension, no passive congestion of lungs or liver. A polyglobulia, up to 7,500,000 red cells per cubic millimetre, clubbed fingers, repeated hemoptyses and nocturnal headaches are usually present. Anginal attacks, analogous to the angina pectoris of aortitis, are frequently observed. The patient becomes ill at ease, the cyanosis increases, and a more or less severe pain referred to the base of the heart sets in. These symptoms are aggravated by the slightest movement, just as in true angina. In advanced cases the patient is nearly constantly somnolent, waking up for brief periods only to drop to sleep again. Another characteristic that distinguishes these patients from those suffering from lesions of the greater circulation is their comparative comfort as long as they are perfectly quiet. Dyspnea and angina occur only when they exert themselves.

The prognosis is ultimately bad, but such patients if protected may live for many years. Death may occur in either of two ways. The cyanosis and the somnolence may increase and the patient quietly pass away during sleep; or the right heart may give out and the patient die from passive congestion of the greater circulation.

In advanced cases little or nothing can be done in the way of treatment. Earlier in the disease an attempt may be made, by vigorous antisypilitic treatment, to check the progress of the endarteritis. Above all, whenever a positive Wassermann reaction occurs in a patient suffering from a chronic pulmonary affection, a thorough antiluetic cure should not be neglected.

TREATMENT OF EXTREME SEPSIS.—Bennecke (*Muench. med. Wochenschr.*, No. 35, 1913). What promises to prove a valuable method of treating severe sepsis comes from Stinzing's clinic at Jena. It consists in the intravenous injection of large quantities of normal human blood-serum, preceded by a corresponding withdrawal of blood from the patient. For an adult, at least 400 c.cm. of serum are required. This presupposes about 1,200 c.cm. of blood, an amount for the furnishing of which a considerable number of donors (6 or 8) are obviously required. The blood, withdrawn sterilely from the donors, is allowed to clot and freed from cellular elements by vigorous centrifuging. Venesection is done upon the patient, and after about 400 c.cm. of thick, dark-colored blood has been withdrawn, the serum is injected into the same or another vein.

Five cases, subjected to this treatment, are reported. All of them were in a desperate state, some nearly moribund and all apparently in a hopeless condition. Three of them recovered, and even in the two that died there was a marked temporary improvement. In no case was there any evidence of hemolysis or any other untoward complication as the result of the considerable injection of serum.

LESIEUR'S SIGN IN TYPHOID FEVER.—Lesieur and Marchand (*Presse méd.*, July 26th, 1913). Lesieur's sign consists in an impaired resonance over the right lower thorax posteriorly. It occurs early in typhoid fever and is apparently due to an enlargement upward of the liver. While its absence does not speak against the diagnosis of typhoid fever, its presence in a doubtful case is extremely suggestive as it does not occur in other infectious diseases. The writers have investigated this sign and have found it positive in 87 out of 114 cases of typhoid fever. Many of the remaining twenty-seven cases were already about to convalesce, while in others additional signs showed that the lung was diseased and therefore probably responsible for the impairment of resonance. Among seventeen cases of benign typhoid fever, the sign was positive in nine instances, while in various non-typhoid conditions, it was only rarely present. Besides its evident diagnostic value, the sign is of use from the standpoint of prognosis, as its reappearance or persistence after the temperature has fallen betokens a relapse, thus suggesting caution in the diet and administration of hexamethylenamine.

OCULO-CARDIAC REFLEX IN GASTRIC NEUROSES.—Loeper and Mongeot (*Progès Méd.*, April 26th, 1913; *Bull. et Mém. Soc. Méd. des Hôp. de Paris*, May, 1913). The oculocardiac reflex consists in a change in the pulse-rate following digital pressure on the eye-ball. In normal individuals, the reflex manifests itself by a slowing of the pulse, averaging six beats per minute. The writers have observed the reflex systematically in cases of gastric neurosis. They found it exaggerated in patients in whom the symptom-complex indicated a hypertonic condition of the vagus; cases showing a sympathetico-tonic state, on the contrary, reacted with an increase of the pulse-rate. An extreme example of this reflex, consisting in a slowing of the pulse-rate amounting to 30 beats per minute, was observed in a case of gastric ulcer that came to operation. A piece of the indurated tissue was excised and on microscopic examination showed an inflammatory infiltration involving the vagus fibres.

PULSUS ALTERNANS.—Gallavardin (*Journ. Méd. Franc.*, No. 49, 1913). An alternating pulse, that is one in which every other beat is weaker than the one preceding and the one following it, is not a very rare phenomenon and of the greatest prognostic significance. Most observers consider it a most ominous sign, since it indicates a profound impairment of the muscular strength of the myocardium. It is not always easily recognizable by the sense of touch, since extrasystoles may simulate it closely. It can be brought out more clearly by a simple procedure. If the brachial artery in the upper arm is partially compressed by a bandage, or better by the cuff of a blood-pressure apparatus, the alternating pulse, if present, can be felt very much more distinctly in the radial. The writer differs from Mackenzie in advising the use of digitalis in this condition.

THE EPIGASTRIC ROUTE IN THE ASPIRATION OF PERICARDIAL EFFUSIONS—Blechmann (*Journ. des Pract.*, May 24th, 1913). Pericardial effusions are best aspirated by the epigastric route. The needle or trocar is inserted at the tip of the xyphoid appendix and passed upward along the posterior surface of the latter, until it reaches the pericardium. By this method the pericardial space is reached at a point where the fluid is most plentiful and most distant from the heart. Another advantage is that the needle traverses nothing but connective-tissue.

TREATMENT IN RINGWORM.—Savill (*Practitioner*, July, 1913). Savill uses a lotion consisting of picric acid, seven grains; camphor, one-half ounce; and rectified spirit, one-half ounce, with excellent success in the treatment of ringworm.

PRACTICAL MEMORANDA.

By WILLIAM T. COUGHLIN, M. D., of St. Louis.

It is said that the fetal membranes may be used as grafts over skin defects. There are many things which may be used and which have been used to take the place of normal skin in grafting, but Sabella claims to have had success with fetal membranes. The amnion is used. It should be examined as soon as delivered, and if normal in appearance it is at once washed in warm water and then placed in normal salt solution and kept in the cold. Sabella says it may be kept for seventy-two hours. The pieces to be used are washed in fresh normal salt solution just before being placed on the wound. The surface apposed to the wound is that which corresponds with the continuation of the inner surface of the covering of the cord. Of course, one prepares the denuded surface with the same care and in the same way as for real skin grafting.

Plaster-of-Paris offers one of the most convenient, reliable and inexpensive of materials for fixed dressings. The chief objection to it is that it completely encases the limb and prevents inspection. This objection is sometimes a good one, but there are many cases in which frequent inspection of the limb is not necessary and many in which it is not feasible. With plaster one may be able to make a good splint for a limb, one which is easily removable for any purpose and as easily reapplied. The home-made plaster-of-Paris bandages are generally quite as good as, if not better than, those sold ready made and are ever so much cheaper. One may use crinoline—and be sure there is little or no glue in the crinoline—or ordinary gauze bandage and incorporate them with plaster. Crinoline is better and is more cheaply bought in lengths of six to ten yards; from this bandages may be made as needed. The plaster is to be well worked into the mesh of the cloth and the bandage must not be tightly rolled. When rolled, wrap the bandage in tissue paper (paper napkins) and tie securely, using bowknots. Plaster must be kept dry; any quantity of it may be bought at one time. Unless kept dry it will spoil and fail you at the crucial moment; never keep it wrapped in paper or cloths. The bandages after they are made and the plaster to be used in making them should be kept in covered metal boxes. It has been said that if plaster becomes damp it may be restored by gently heating. If this be attempted, remember that if you heat it too much you will surely render it entirely useless. Cold water is best for moistening the bandage. Use a bucket nearly filled so that it will be deep enough. If the best dental plaster is used, you need not put any salt in the water. One may make a splint for a limb by taking a bandage not quite as wide as the splint wanted, next a piece of muslin 8 in. longer than the splint is to be, and three times as wide. Spread the

muslin on a table, and placing the bandage on its middle third, 4 in. from one end, unroll the bandage toward the other end. Arriving 4 in. from the end unroll backward to the starting point, and so back and forth until the required number of thicknesses has been unrolled. Now fold over the ends and sides with the muslin, and the splint is ready to be moistened; this is best done in a long pan. If the edges are first stitched, no plaster can escape from the muslin cover. When moistened, the splint is placed in position and bound firmly to the part, the latter being held quiet while the former is drying. Such splints are harder to make than board splints, but they fit accurately and are comfortable.

Perhaps some of the readers in their practice have had or will have cases of seeming intractable dysmenorrhea in young women. It is pretty certain that all home remedies will have proved futile before a physician is consulted, and it is also nearly certain that almost every physician will try to determine the cause and remove it. But in the cases referred to, treatment directed to general conditions has failed, as has also that intended to relieve local congestion. Now comes the question of dilatation and curettage. I am glad that dilatation and curettage are not so widely vaunted as a cure-all as was the custom when I was a medical student. Dilatation and curettage will not cure all these cases any more than it will cure simple leucorrhea in girls and young women. After all other means fail and before trying operative measures, try gradual dilatation with graduated sounds. It is astonishing how some of these cases yield to it. It needs no anesthetic and may be done in the office—always in the presence of a third person—though the home would be better could a proper chair or table be had there. Rigid cleanliness is observed. A small probe may be first passed if an ordinary uterine sound cannot be introduced. Never try to pass sound or probe unless the uterus is drawn down and held with the volsellum. Proceed very slowly, and do not use force. Be sure that the probe or sound passes through the internal os. As it does so the patient usually experiences slight pain, and perhaps cramps come on. If these cramps are similar to those for which she comes to you, you may cure the patient by this procedure. Leave the probe or sound in place for two or three minutes, then remove and insert the next larger size at once. Each is allowed to remain for about three minutes, and each must surely pass through the internal os. Do not curette.

Try the above procedure the day before the expected menses; if this cannot be foretold, then every two days during the week before. In fact, the results are often better if three treatments before the first period are given. The treatment had better be repeated before each succeeding period, for three or four months. If not relieved by the first treatments, further treatments will not cure.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

It is a frequent source of wonder to many that medical men have, in these later years, so persistently refrained from investigating, without prejudice, the claims that from times immemorial have been put forward by seers, prophets and magicians. Yet, as I recently heard Dr. Eder, to whose studies in psychology I made some allusion in your issue for September, say, now that we have learnt from Freud how that there is basis for a scientific elucidation of the "stuff that dreams are made of," it may be that we are within even measurable distance of discovering how, within limitations, the future may be forecasted. As a matter of fact, we do, every day, predicate what line of action certain persons will take in certain circumstances; and the accuracy of our forecast depends on the accuracy of our knowledge of the character—or bodily and mental mechanisms—of our subject. It is not foolish to assert that, if the study of the correlation of physical indicia with mental characteristics be ever perfected, we shall be able (always within limitations) to hazard something more than a guess at the future awaiting the infant, "mewling and puking in the nurse's arms." The palmists, or cheiromancers, have long since asserted their ability in this wise. What possible basis of truth may there not be in their claims?

If the hand of any well-developed subject be examined, in respect of its palmar aspect, three well-marked lines may usually be seen. There is one, a bold line as a rule, that skirts the base of the thenar eminence, running from the wrist to the cleft between the thumb and index finger. This is the 'line of life.' Another line, usually commencing where this line of life disappears, on the outer side of the metacarpus between the thumb and index finger, traverses the palm, ending more or less vaguely about the hypothenar eminence. This is the 'line of the head.' A third line, arising at the ulnar border of the palm, and nearer to the fingers than the line of the head, runs across the palm terminating usually somewhere between the bases of index and middle fingers. This is the 'line of the heart.'

Now, if the ring and little fingers be flexed on the palm, while the index and middle fingers are extended, as in the apostolic gesture of benediction, this 'line of the heart' is thrown into marked relief. But, if all four fingers be flexed on the palm, the 'line of the heart' and the 'line of the head' become more or less blended, and there is one deep corrugation crossing the palm from side to side, broken only in the middle.

Several years ago, Dr. Reginald Langdon-Down, the son of that Dr. Langdon-Down who first described the condition known as 'Mongolian imbecility,' pointed out that in Mongoloid imbeciles the usual lines on the palm are frequently irregular, and that, on the left hand in particular; there is often but one transverse line instead of the two that I have just described as those of the 'heart' and of the 'head.' Dr. Langdon-Down, not long ago, called my attention anew to this point, apropos a paper written by me dealing with Mongolism, and he kindly showed me his large collection of handprints. There is no doubt as to the accuracy of his investigations; but very frequent observation since at several clinics for children has taught me that this abnormal line formation is seen, not in Mongolism alone, but in association with other forms of cerebral defect, and not very infrequently in cases of athyreosis. I have not seen it in a quite normal person.

There is no doubt, of course, but that the general development of the hand-creases is correlated with the acquisition of the power of performing complex hand-movements; and examination of the palms of apes and of monkeys shows clearly enough that, in them, the separation of the lines of the 'head' and of the 'heart' is not met with. The orangs at one London Zoo, for instance, have single transverse lines, just as have so many 'Mongols.' But they do not seem to have the faculty or the occasion for giving the apostolic gesture; and they grasp a utensil, or a straw, with all four fingers flexed on it, just as a badly brought up child handles its fork and knife. It does not, however, appear that the peculiarly human power of performing the more complex and differentiated hand movements depends so much on muscular arrangements as on 'cortical' ones; and therefore it may be truly said that the hand is, by virtue of what can be done with it, an index of the brain. Now it is usually said that the development of the lines on the palm take place in the individual, *pari passu* with the acquisition of the faculty of initiating and carrying out certain complex movements; in other words, that in this case, external form follows the exercise of cerebral function. If this were the whole truth, one would expect to find that the lines on the palm of an infant were always of a simple or primitive type, in accordance with the restricted range of possible movements allowed by the only partial organization of the immature *cortex cerebri*. But, as Prof. Keith has pointed out in his book on "Human Embryology," and as all may easily satisfy themselves, this is not the case. The healthy and well-bred child of good parentage has the three great lines clearly and well plotted out, not merely at birth, but in the last weeks of fetal life. External form, in this case, anticipates not merely the exercise of cerebral function, but anticipates the organization of that cerebral mechanism wherewith the function is to be exercised. But, in certain cases at least, wherein there is operative in the later months of intra-uterine life some such conditions as those provocative of cretinism, Mongolism, or other forms of defect, this anticipation does not occur. There is persistence of a primitive type of hand-crease, seeing which we may confidently foretell defective cerebral development in the future, and a marred or imperfect life. Who dare assert that the first cheiromancers of the East had not observed the frequent correlation of the single transverse line with defects of 'heart' and of 'head'; and that they were not therefore reasonably justified in some of their teachings? Another point is very interesting. As Dr. Langdon-Down has shown, it is more common to find these defects

in palm-creases on the left than on the right hand. The reason is, clearly, because the right hand is that which has been for long the more highly developed under the guidance of the brain, and, therefore, under stress it will retain its 'human' character more definitely than will the left. But it is an axiom with palmists that the left hand indicates the fate 'born with us'; and the right, that which we can 'determine for ourselves.' Put into clinical form, we find that, when the right hand as well as the left is imperfectly marked, the potentialities of the individual, in the way of response to educative stimulus, are far less than when the left alone is so marked; and these again less than when *both* are of high type. We are, in fact, dealing with a group of characters that tend signally to differentiate advanced members of the human race from those which are lower in the scale, and the whole human race from the apes. These are characters which have not been, phylogenetically, acquired so long that they are inevitably present in every individual. Moreover, they are characters that undergo some modification during the life of the individual; for there is reason to believe that in some cases, with growth and personal evolution, a more primitive type of palm-crease may give place to a more complex one. But this is certainly true: that a child born with a 'high type' of palm-creasings is usually found to be the offspring of cultivated and intelligent parents; while the 'lower type' of palm is indicative either of low breeding or of 'reversion' under pathological stress. The study of these palm-creases, therefore, occupies a peculiar place in morphological science. These creases are inborn with us, in great measure, certainly. But they are also subject to acquired modification, and such modifications seem to tend to be transmitted to succeeding generations, appearing in each in accordance with the law of anticipation at successively earlier ages. In fact, they fall into line with those other anatomical characters which Sir Havelock Charles showed, several years ago, to be always present in the unborn children of Punjabi parents, in readiness, so to speak, for these children, in later years, to be able to adopt easily the peculiar 'ham-squatting' attitude that the Punjabis, like so many other Orientals, habitually assume. These markings and peculiarities described by Sir Havelock Charles are not found in the unborn children of those peoples who do not now squat on their hams. So that in this case we have to deal with the transmission of anatomical characters associated with the exercise of a function that has been specially acquired by a particular group of races, and that still has to be acquired by each individual in his turn. But, nevertheless, this function is one more easily acquired by those whose ancestors have first acquired it, for, by virtue of his ancestors' pains, he already has the structural mechanism. The cortex has not then, so to speak, to make its own tools.

The actual advantage, however, to a newly-born child, of having two creases instead of one on each hand is seemingly far less than that of having facets and articulations convenient for the assumption of a desired attitude. But the significance of these palm lines is not a whit the less, just because we cannot see that the soft skin is not the more easily moulded for them. If, however, we look at the thick corium on the palm of the orang or the gorilla we realize that once far back in the history of the race it was, to the growing child, a very real advantage to have its thick palm well adapted to the performance of those actions that might enable it to get the better of its friends or its enemies.

PARIS LETTER.

SCARLATINA.

By AUGUSTE A. HOUSQUAINS, M. D.

The clinical history of scarlatina is to-day so well understood on account of the investigations on the part of the great clinicians during the last two centuries, notably those of Sydenham and Trousseau, that one is tempted to believe that, with the exception of the discovery of the causative agent, there is nothing further to add. Nevertheless, after having been sufficiently neglected for some time, scarlatina is again the subject of a number of interesting investigations which have for their object a clearer and more complete study of its characteristics.

The pathogenic germ is still unknown, for the reason that there is no unanimity of opinion on the subject. Without any positive proof we were inclined until the present to the opinion that on account of certain complications, the streptococcus ought to be held responsible as the cause of the disease. But to-day we are sceptic as to the truth of this attitude. As is known, Gruenbaum, and other experimenters who followed in his wake, succeeded, some twelve years ago, in inoculating the chimpanzee with scarlatina. Recently these experiments have been taken up again by Levaditi, Landsteiner, and Praseck who have inoculated anthropoid apes under the skin or in the peritoneum with the secretions of those affected with scarlatina—the buccal mucus, blood, lymph, etc. They succeeded in producing in these apes a morbid process similar to that of scarlatina. The disease thus produced appeared without doubt to be due to a specific germ, but not belonging to any species of the streptococcus.

These experiments, besides the light that they throw on the problem of scarlatina, have a genuine value from the point of view of the prophylaxis of this disease. In fact, the agent of the unknown contagion, it would seem, has for its habitat the blood and lymph and also the secretions of the patient: nasobuccopharyngeal mucus, the lymphatic ganglions, the pus, the urine, etc. The epidermic scales are not directly contagious; they are only contagious through their being contaminated by infectious secretions, notably by the mucus from the pharynx, a theory already advanced by Lemoine, Comby, etc. Hence the etiological conclusion which should be arrived at is that scarlatina is contagious, not only during convalescence, that is during the period of desquamation, as has been the belief for a long time, but from its onset and during its evolution. This being the case, complete isolation of the patient should take place early, and all necessary precautions be insisted upon so that those in whose care the patient is may not be, on account of being carriers of germs, the cause of the dissemination of the disease.

To carry out this early isolation it is important to make a correct diagnosis, as soon as possible, by studying the symptoms which are sufficiently characteristic so that this end may be achieved. To help in the making of an early diagnosis, divers new symptoms have recently been noted.

Unfortunately, in spite of the assistance that they may be, in certain cases, to the clinician, it does not appear that any of them have the unmistakable pathognomonic characteristic which has been attributed to them by the investigators. Among certain signs, the one which should be mentioned first is "the bend of the elbow" described by Pastia, of Bucharest. This sign, as is known, is an early appearance, on the surface of the bend of the elbow, of an eruption in parallel faint lines the number of which varies and the color of which progressively deepens, this lasting as long as the eruption itself and even continuing in the form of pigmented tracks. Unfortunately, this sign is neither as constant nor as infallible as it was thought to be when first brought to the notice of the medical public. It is often lacking in the masked type of the disease where it would be of the greatest help in making a diagnosis, since in this type an unmistakable sign would vanquish all doubt. On the other hand, it has been observed in other eruptive fevers, notably in rubeola.

The same criticism obtains as regards Filatow's sign (pallor of the lips and chin, very evident by contrast with the red discoloration of the rest of the face), as well as in connection with Reyer's sign. These signs are not peculiar to scarlatina; they are found in other exanthematous affections. Even the raspberry aspect of the tongue, which is of considerable value when it is so well marked that one might say it is typical of scarlatina, has been seen in other diseases—in rubeola, according to Vladimirow, and even in certain gastro-intestinal infections.

The scarlatinal angina, which is one of the manifestations that might be said to be unswervingly constant, more so in fact than the exanthem itself, can assume such variations that it would be well to emphasize them here. With the red or pseudomembranous anginas which are known to all physicians, ulcerous anginas may be encountered. Sometimes, it is a question of a superficial ulcer simulating an aphthous lesion, sometimes an ulcer of slow progress, and again, more rarely, a much more severe condition—the necrotic angina of Mein and Halle, who after scraping the surface, uncovered an ulceration with sharply cut perpendicular edges but with no induration. The local symptoms are mild, the general symptoms deceiving; nevertheless, there is a grave toxemia of the organism and death may result from it. The diagnosis of these ulcers which are of a decided contagiousity is not an easy matter, since they may be confounded with the gangrene which may exist in scarlatina or with a chancre of the tonsil.

Another idea relative to the angina of scarlatina, and to which attention has recently been called, is the possible appearance of a second angina during the third period of the disease. The affected ganglionic system is brought to light by an organic infection which soon manifests itself in one or another of the complications of the disease. The adenopathy which accompanies this form of angina may end in suppuration. The other forms of adenopathy which are independent of any angina and come on during convalescence get well rapidly without suppuration (Bela Schiek).

Among the complications which occur in scarlatina, it would be well to mention the one which has recently been studied—namely, the involvement of the ductless glands, particularly the suprarenal capsules and the pancreas. Scarlatinal complication of the suprarenal capsule is shown by the symptoms of functional insufficiency of these glands and particularly by circulatory troubles and asthenia. The inflammation of the pancreas, often associated with the foregoing complication, is made evident

by loss of weight and the impossibility to digest fats. This form of scarlatinal pancreatitis resembles the pancreatitis recently pointed out as a complication of an infection from mumps.

Further mention should be made of the work of Nobécourt on cardiac complications, of Rolleston on arterial tension, of Sachs on nervous complications. Among the latter there have been noted infectious polyneuritis, streptococcal cerebrospinal meningitis, suppurative meningitis of otitic origin, and simple meningitis, the inflammatory nature of which is demonstrated by lumbar puncture. Of a truth, the cases which were formerly classed under meningism are dependent also on a real inflammation, although slight, of the meninges.

If the symptoms and the complications of scarlatina have thus been benefited by contemporary researches, and if the clinical picture of this affection has been completed by being enriched with new ideas so that the diagnosis is made easier, the treatment has come in for its share of attention. Numerous researches have been made and numerous attempts at changes in treatment have been tried. Various vaccines and serums have been prepared and used for purposes of inoculation. Unfortunately, the results obtained have been mostly negative. Antistreptococcal polyvalent serums have not had the success that one thought they would have. Moreover, this fact would not have been astonishing if the researches of Levaditi, Landsteiner and Praseck had not presaged that the unknown germ of scarlatina was different from the streptococcus. Neither Mosen's serum, nor Marfmann's scarlatin obtained by a special preparation of the squamæ, the blood and urine of a patient, nor all the other vaccines and products proposed by various authorities have proved efficacious. And again, both preventive immunization and a cure leave much to be desired. Thus it must be admitted that as long as we are still in doubt as to the exact nature of the causative micro-organism of scarlatinal infection, and as long as we are not able to isolate it and study it in its various biological reactions, our advances will be crippled.

But if the antistreptococcal serums have been inefficacious, the use of antidiphtheritic serum has been attended with gratifying results. Benjamin and Witzinger have obtained by this empirical procedure, when applied preventively, a much greater benignity in the cases which they treated. A further study of their experiments should be prosecuted. We know, moreover, that the antidiphtheritic serum has been proved to be useful in affections different to those caused by Loeffler's bacillus. The pseudomembranous streptococcal anginas are favorably influenced by the antidiphtheritic serum; hence its employ in the streptococcal complications of scarlatina. From the investigations of Benjamin and Witzinger it would appear that it is of value in the treatment of the disease itself, whether or not the streptococcus is the real agent. This procedure merits a trial and can always be essayed in severe cases of scarlatina and in those who have been exposed to the disease and have run the risk of contracting the infection.

The recent researches in regard to scarlatina, even though they have not led to any decisive discovery, constitute considerable progress and should encourage further investigation. The etiology and the specific treatment are matters which are of the greatest interest to-day. The investigations, which have already been made and which it must be admitted have been on the road to enlightenment, give us hope that the day is not far distant when this double problem will be solved.

BOOK REVIEWS.

OUTLINES OF PSYCHIATRY. By William A. White, M. D., Superintendent Government Hospital for the Insane, Washington, D. C.; First Lieutenant, Medical Reserve Corps, United States Army, etc. etc. Fourth Edition, Revised and Enlarged. New York: The Journal of Nervous and Mental Disease Publishing Company. 1913. Price, \$3.00.

White's book has been reviewed in these columns as each succeeding edition has made its appearance, and with the improvement noted in each edition has gone an increasing amount of praise. The present, fourth edition, shows two additions which the reviewer takes particular pleasure in pointing out—one is the chapter devoted to the Binet-Simon method of grading the mentally defective, and the other is in the more constant use of good case histories to illustrate types of mental disease. The latter is especially effective and will be much appreciated by the student, for whom the book is especially planned.

White possesses an easy, attractive style and has an unusual breadth of view. This comes in especially in the chapter on dementia præcox, which, by the way, is one of the best in the book.

A chapter on the presenile psychoses, in which Alzheimer's presenile dementia is considered, is especially to be commended, as too little attention has been accorded in recent textbooks to this admirable bit of work.

The chapter on principles and methods of examination is rather tedious and contains so many complicated and difficult systems of data recording, that it is questionable if it is a practicable routine to attempt to follow. However, the error, as a rule, is on the side of too little rather than too much, so that even this chapter may serve the purpose of stimulating better recording of clinical data in institutions for the treatment of the insane.

This book of White's is without doubt one of the best by an American author, and its continued improvement as each new edition appears makes it worthy of the highest praise, for that means that its author is trying to express in each new edition that psychiatry is a living and growing phase of medicine.

FREUD'S THEORIES OF THE NEUROSES. By Dr. Eduard Hitschmann, of Vienna. Authorized Translation by C. R. Payne, Westport, N. Y. With an Introduction by Ernest Jones, M. D., M. R. C. P., of London. New York: The Journal of Nervous and Mental Disease Publishing Company. 1913. Price, \$2.00.

With the English translation of one of the critical papers on Freud, we are, apparently, entering on a new phase of the Freudian literature. Hitschmann's monograph appeared some two years ago and was one of the earliest attempts to systematize the widely scattered presentations of the various phases of the Freudian psychology. It was deemed to be a successful effort, chiefly for the reason that its presentation was more or less definitely systematized, a thing which the Freudian writers have not, as a rule, attempted to do. That Hitschmann was a disciple of Freud and a follower and believer of most of the intricate hypotheses clustering about him, has no particular influence upon the merits of his presentation. What everyone wanted and hoped to get from his book was a clear presentation of Freud, and nothing more. The disappointing thing was, and is, that neither in Hitschmann's original monograph nor in the present translation do we get anything of the kind. What we do get is not very different from that obtained in reading the several contributions of Freud himself, which, after all, is in all likelihood the only way at present of informing ourselves about it. The reason is clearly stated in the introduction by Ernest Jones to the present translation—namely, that the Freudian doctrine is a growing body of science, not a fixed philosophical system. If that is so, then the need for such a presentation as Hitschmann's, and also the need for a translation is not apparent. However, whether the need is vital or not, Hitschmann's book and its translation are here, and there remains, naturally, something to be said of it. To render the Freudian doctrine into English is a suffi-

ciently difficult task in itself, but to translate a résumé, or criticism of Freud is much more difficult, and Payne's translation suffers from this double difficulty. It is full of bits of unattractive phraseology and clumsy expression, which no doubt arise from the attempt to be accurate, but the result is more confusion—perhaps even more than the original Freudian writings might cause. The great service which this translation might render English readers is, that it ought to awaken in them the desire to go to the original sources and study the Freudian doctrine directly from Freud's own papers and from those of his more temperate followers. The Freudian papers are now readily accessible and they are not difficult reading in themselves, although the doctrines are at first strange and incomprehensible. No one has described more clearly his ideas upon the neuroses, dreams, sexuality, etc., than Freud himself, and no amount of interpretation in the hands of others can render clearer an obscure thing than he has. Upon one point Hitschmann's book is important—his emphasis upon the fact that the Freudian doctrine is a growing doctrine, and for that reason must of necessity be a changing one invalidating at once the chief criticisms charged to Freud by his opponents. As a matter of fact, this is the greatest praise that can be said of any theory, and Hitschmann's emphasis is of great value.

As an introduction to the more intense study of the Freudian literature, this book is of value, in spite of its evident defects as a translation, and for this reason it is to be recommended. The indebtedness which American neurology owes to this and other of the Nervous and Mental Disease Monographs should be again expressed, and if this translation of Hitschmann's monograph is unsatisfactory, the fault no doubt is due to the difficulties inherent in a new, strange and intricate matter, than to the industry and knowledge of the translator.

PRINCIPLES OF HUMAN PHYSIOLOGY. By Ernest H. Starling, M. D. (Lond.), F. R. C. P., F. R. S., Hon. M. D. (Breslau), Jodrell Professor of Physiology in University College, London. Philadelphia: Lea and Febiger. 1912.

"From his beginning man has been accustomed to draw a sharp line of distinction between those phenomena which by their constant occurrence seemed to him natural, and therefore explicable, and those phenomena of which he could not see the determining antecedent, and which were to him, therefore, anomic and capricious. To the latter he set up graven images, and not perceiving his own springs of action, endowed them with a self-determining personality such as he imagined himself to possess. This procedure, though possessing certain advantages in allowing him to perform his common duties free from the ever-lurking fear of supernatural interference, suffered from the great drawback that it fenced off unknown phenomena as unknowable and not to be known. It has therefore acted as a continual check on the growth of man's knowledge and control of his environment. Such a graven image is 'vitalism.'"

This striking quotation from the introduction of Starling's brilliant textbook on physiology is so good that it should not go unquoted at this time when we are threatened with a reawakening of metaphysics. The entire work echoes this strictly sane and scientific attitude. Problems are taken up basically, not superficially. Thus the first 200 pages are devoted to a discussion of those questions in chemistry and physical chemistry upon which so large a part of the facts of physiology depends.

In the main body of the book the detailed consideration which the author devotes to the nervous system is worthy of note; in fact, the completeness of the work and the easy, graceful style in which it is written are points which should come in for commendation. The external form of the book is excellent, the more than 1,400 pages occupying the space usually filled by half that number.

FOOD IN HEALTH AND DISEASE. By Nathan S. Davis, Jr., A. M., M. D., Professor of the Principles and Practice of Medicine in Northwestern University Medical School, etc. etc. Second Edition. Philadelphia: P. Blakiston's Son and Company. 1912. Price, \$3.50.

This work is divided into two main sections, the first being devoted to a consideration of the articles of normal diet with the usual tables of caloric values and percentage compositions. Not the least interesting part of this section is an account of the dietaries of some primitive peoples and a comparative table of the dietaries of civilized people under various social conditions. The second section of the book discusses separately under its own heading the dietary indications of each disease. Here a greater attention to detail would en-

hance the value of the work. A number of sample diet lists in the treatment of such conditions as typhoid fever and gastric ulcer would add much value, by way of example, to the generalizations that appear. In the former disease the diet plan of Coleman and Schaeffer certainly seems worthy of mention, while in the latter condition the cardinal point lies not so much in the article of food as in the manner of its preparation and the amounts and intervals at which it should be given. It is high time that this fact should be appreciated and that it should receive proper emphasis in a work devoted to the subject of dietetics. In outlining the treatment of obesity, after very properly stating that alcoholic beverages should be forbidden, four sample diet lists appear, all of which prescribe some kind of wine in varying amounts. This paradox is due to the fact that the author has blindly copied a number of dietaries of European clinicians whose problem is entirely different from ours because of the general consumption of vinous beverages by all classes in European countries. Hence a diet list suitable to our own conditions would have been a valuable asset.

STUTTERING AND LISPING. By E. W. Scripture, Ph. D. (Leipzig), M. D. (Munich), Associate in Psychiatry, Columbia University, etc. etc. New York: The Macmillan Company. 1912. Price, \$1.50.

This is a valuable little book on a much neglected subject. It is only recently that physicians have considered speech defects worth serious consideration. Scripture is particularly fitted for the task which he has set himself to do. As an experimental psychologist, with special training and interest in experimental phonetics and a continued experience in the Speech Department of the Vanderbilt Clinic, he has been able to see the problem in its various phases and at first hand. The result is a clear exposition of a very difficult subject. The description of the physiology of speech defects is based upon the physiological interpretation of speech and it rests upon experimental evidence in the study of normal speech production. Methods of treatment are described clearly and each is adapted to the peculiar form of defect which is present. It seems very likely that a special department for speech defects will soon be a part of every well-equipped clinic. The book will be an invaluable aid to those who wish to do something positive to relieve one of the most distressing and annoying results of defective nervous organization in children. Much might be said in praise of the clear and concise exposition of the subject, the well-selected diagrams and photographs and the entire arrangement of this admirable little book of Scripture's. The best that the reviewer can say, however, is to recommend the book with enthusiasm.

PHYSICAL DIAGNOSIS. By Richard C. Cabot, M. D., Assistant Professor of Medicine in Harvard University. Fifth Edition. Revised and Enlarged, with 5 plates and 268 Figures in the Text. New York: William Wood and Company. 1912. Price, \$3.00.

This edition, like the previous ones, bears the decided stamp of the author's individuality. The chapters on the circulation have been recast; the sphygmograph, which in the previous edition received such harsh treatment, has come into its own, and the work of Lewis and others on the cardiac arrhythmias receives due attention. The information which has recently been gained through the x-ray, especially in the diagnosis of obscure conditions of the chest and in the digestive tract, has been incorporated and a number of radiograms are reproduced. Very scant attention is given to methods of diagnosis in disease of the nervous system, a fact to be regretted in the light of the ever-growing importance of nervous manifestations. To the reviewer the book suggests itself as more useful to the practitioner than to the student of medicine.

A MANUAL OF SURGERY. For Students and Physicians. By Francis T. Stewart, M. D., Professor of Clinical Surgery, Jefferson Medical College, etc. etc. Third Edition. With 571 Illustrations. Philadelphia: P. Blakiston's Son and Co. 1913. Price, \$4.00.

This, the third edition of Stewart's "Manual," testifies to the popularity of the volume with undergraduate students. Notable additions have been made to the chapters on anesthesia, technique, syphilis, the vascular system, thyroid, stomach, brain and spinal cord.

The volume is handy in size, and yet contains enough material to serve as an excellent framework upon which an instructor can build a good course for third and fourth year students. The first thirteen chapters deal with general surgical principles and the last eighteen with regional surgery.

DIE ENTSTEHUNG DER KURZSICHTIGKEIT. Von Dr. Georg Levinsohn, Privat-Dozent fuer Augenheilkunde an der Universitaet Berlin. Mit 3 Abbildungen im Text. Berlin: Verlag von S. Karger. 1912. Price, 2 m. 50.

Levinsohn gives a brief account of the various theories which have been propounded to account for axial lengthening of the eyeball which is the essence of the myopic process.

According to Levinsohn, the force of gravity produces a certain degree of proptosis when leaning forward, caused, in part, by the weight of the eyeball; in part, by the increased volume of blood in the orbital veins. Thus is induced traction upon the optic nerve and pressure by the orbital fat on the posterior pole of the eye. These two factors weaken the sclera at the posterior pole, and cause traction on the nerve head upward and inward; which in turn gives rise to the myopic crescent in its usual situation, down and out. In young animals suspended head downward, the author has been able to cause lengthening of the eyeball.

THE SURGICAL CLINICS OF JOHN B. MURPHY, M. D., AT MERCY HOSPITAL, CHICAGO. Volume II, Number 3, June, 1913. Published Bi-Monthly. Philadelphia and London: W. B. Saunders Company. 1913.

This volume represents the same type of incisive clinical reasoning that has characterized all the previous volumes of the Murphy "Clinics." The first clinical report in the volume—namely, the one on Obturator Ileus illustrates better probably than can the reviewer how skilful Dr. Murphy is in his deductive methods; and this one case report alone makes the volume more than worth while. In addition, however, to the subject of intestinal obstruction, this number of the "Clinics" contains the following case reports: Intestinal Stasis, Paratracheal Tumor, Dermoid of the Rectus Muscle, Ankylosis of the Jaw, Subcoracoid Dislocation of the Humerus, Fracture of the Femur, Dislocation of the Semilunar Cartilage, Granuloma of the Cecum, Arthroplasty of the Hip, Pott's Disease, Procidentia Uteri, Cholecystitis, Acute Suppurative Prostatitis.

THE EXPECTATION OF LIFE OF THE CONSUMPTIVE AFTER SANATORIUM TREATMENT. By Noel Dean Bardswell, M. D., M. R. C. P., F. R. S. (Ed.), Medical Superintendent, King Edward VII Sanatorium. Edinburgh, Glasgow, and London: Henry Frowde, and Hodder and Stoughton. 1913.

The author reviews the records, both during and subsequent to sanatorium treatment, of 241 patients under his charge in the various stages of pulmonary phthisis, and by a series of tabulations shows the average expectancy of the life of the patients in the incipient, moderately advanced, and far advanced stages of the disease. The little volume also points clearly to the necessity of early diagnosis, when the disease may be arrested with certainty, and the victim after proper treatment and education pursue his vocation and reach a comparatively normal life's expectancy.

LEHRBUCH (Frueher Kompendium) DER HAUT- UND GESCHLECHTSLEIDEN. Ein-schliesslich der Kosmetik. II. Band: Geschlechtskrankheiten. Von Sanitäts-rat Dr. S. Jessner. Vierte sehr erweiterte Auflage. Mit zahlreichen Ab-bildungen im Text und auf 22 meist farbigen Tafeln. Wuerzburg: Verlag von Curt Kabitzsch. 1913.

This is one of Dr. S. Jessner's well-known "Lehrbuchs." The text is an explanation of modern methods in relation to the subject, and is replete with splendid illustrations, many of them in colors.

The volume also gives a complete résumé of the much-written-of salvarsan question, together with the different methods of administration and their effects, discussing the various reactions and their causes.

PRACTICAL BACTERIOLOGY, BLOOD WORK AND ANIMAL PARASITOLOGY. Including Bacteriological Keys, Zoological Tables and Explanatory Clinical Notes. By E. R. Stitt, A. B., Ph. G., M. D., Medical Inspector, U. S. Navy; Graduate, London School of Tropical Medicine, etc. etc. Third Edition, Revised and Enlarged, with 4 Plates and 106 Other Illustrations Containing 513 Figures. Philadelphia: P. Blakiston's Son and Co. 1913. Price, \$1.50.

This manual contains a wealth of information compactly arranged, yet in a form well suited to the usual needs of the general laboratory. Most of the illustrations are well chosen, but those of the malarial parasite are poorly done. A valuable chapter concerns the recognition of the various insects directly or indirectly responsible for human disease.

DISEASES OF THE RECTUM AND PELVIC COLON. By Martin L. Bodkin, M. D., New York, Rectal Surgeon, St. Mary's Hospital, the Williamsburgh Hospital and the Howard Orphan Asylum, etc. etc. Illustrations specially Drawn by Francis A. Deck. New York: E. B. Treat and Company. 1913. Price, \$3.50.

This volume follows the general lines usually laid down in the various works on diseases of the rectum, with the exception that there is a special chapter devoted to the relationship between rectal and gynecological diseases.

The cuts are, without exception, excellently clear, those illustrating the technique of the operation for cancer of the rectum being particularly well executed and reproduced.

CARDIO-VASCULAR DISEASES. Recent Advances in Their Anatomy, Physiology, Pathology, Diagnosis and Treatment. By Thomas E. Satterthwaite, A. B., M. D., LL. D., Sc. D., Consulting Physician Post-Graduate, Manhattan State, Orthopedic, Babies,' Champlain Valley Hospitals and Northeastern Dispensary, etc., etc. New York: Lemcke and Buechner. 1913.

In clear, concise, simple and understandable language the author sums up the latest information on cardiovascular diseases. It is indeed a pleasure to find an author who, thoroughly equipped with the scientific data, is still capable of reducing the information so that it becomes readable as well as instructive to the average physician.

BUILDING A PROFITABLE PRACTICE. Being a Text-Book on Medical Economics. By Thomas F. Reilly, M. S., M. D., Professor of Applied Therapeutics, Medical Department Fordham University, New York City. Philadelphia and London: J. B. Lippincott Company. 1913.

Among the subjects treated in the book are post-graduate study, hospital and dispensary service, the choice of a location, extra-practice sources of income, collections, the law and the doctor, on making friends, etc. It is written primarily as a guide for the young man; and in an age when 'personal gain' is paramount rather than 'social service,' it would be well for him to follow the advice given if the desire be to succeed in a worldly sense.

HANDBUCH DER FRAUENKRANKHEITEN. Von M. Hofmeier, O. Ö. Professor der Geburtshilfe und Gynaekologie in Wuerzburg. Zugleich als 15 Auflage des Handbuches der Krankheiten der Weiblichen Geschlechtsorgane, von Karl Schroeder. Mit 290 Abbildungen im Text und 10 Tafeln. Leipzig: Verlag von F. C. W. Vogel. 1913. Price, 16 m.

This work, in its fifteenth edition, is the best known standard textbook on gynecology for the German medical student. To show the most recent advances in this specialty, Hofmeier has induced Polano to add a new chapter dealing with the value of the x-ray in gynecological therapeutics.

DAS GUENSTIGSTE ELTERLICHE ZEUGUNGSALTER FUER DIE GEISTIGEN FAEHIGKEITEN DER NACHKOMMEN. Von Dr. Vaerting, Berlin. Wuerzburg: Verlag von Curt Kabitzsch. 1913. Price, 1.20 m.

In the opinion of the writer the age of the father plays a definite rôle in the intellectual qualifications of the child. For the purpose of investigating this particular problem of eugenics the writer studied the parentage of twenty-five famous Germans. The interpretation of his findings is presented in this little volume in an interesting fashion.

EXPERIMENTAL PHYSIOLOGY. By E. A. Schaefer, F. R. S., Professor of Physiology in Edinburgh. With Eighty-three Illustrations. New York and London: Longmans, Green and Co. 1912. Price, \$1.35.

This book, as its title implies, is a study in experimental physiology, with full and concise directions for the preparation of the electrical and mechanical apparatus, and the tissue specimens.

It is indeed a guide for the muscle, nerve, and other experiments, usually performed in the better physiological laboratories.

WIRKLICHE UND ANGEBLICHE SCHAEDIGUNGEN DURCH SALVARSAN. Bearbeitet von Dr. Artur Schmitt, I. Assistent der Klinik fuer Hautkrankheiten in Wuerzburg. Wuerzburg: Verlag von Curt Kabitzsch. 1913. Price, 4 m.

We have here a little volume, giving a complete review of the salvarsan question: its methods of administration, methods of mixing, various good and ill effects, together with a complete bibliography for the last two years.

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EDITORIAL.

IS THE GOSPEL OF PREVENTIVE MEDICINE AN UNALLOYED BOON?

Those physicians, who have made a cult of preventive medicine, who have striven in no disguised way to bring before the people at large the fullest meaning of their endeavors, are certainly entitled to the praise which goes to all enthusiasts, be they medical or lay, when they set out to stir the dormant thought of mankind; but when this is granted them, the medical critic has done his duty and may perhaps be allowed to ask whether the seeds that are sown invariably fall on the right sort of soil. By the right sort we mean an alluvium that may produce such clarity of thought that benefits to the individual must arise. Of course, were our many propagandists to halt in their endeavors every time they are in the throes of a new measure to save mankind and give thought to those of the underworld of intellectualism whose rocky soil is opposed to any growth of new ideas, few indeed would be their dicta; for if discouragement counts for anything—and even the propagandist is blessed with the finer sensibilities—its blighting effects would ere now have killed off even the most effulgent phase of enthusiasm. But leaving aside the poorly intellectual—those of the vast and evergrowing army of the unwashed—let us concern ourselves with a higher grade of society, that section of it that is supposed never to be without the ballast of common sense, and note whether or not the propagandist has played ducks and drakes with its intelligence. And we are limiting ourselves to the social grade between the underdog and the froth because the great middle class is supposed to be made up of serious-minded individuals of a mental calibre that ostracises frivolity and waxes strong on new ideas, hence justifying its claim of being the backbone of the nation.

In a recent book* by Mr. Arnold Bennett there is a significant passage in which one Alpha describes to what extent his friend Omega has profited by the teachings of preventive medicine. In reply to the query whether Omega has ever had appendicitis, Alpha says: "Not he! He's never had anything. But he informed me that before he went to Mexico last year he took the precaution of having his appendix removed, lest he might have acute appendicitis in some wild part of that country where there might be no doctor just handy for the operation. . . . I believe if he had his way there wouldn't be an appendix left in the entire family. He's inoculated against everything. They're all inoculated against everything. And he keeps an elaborate medicine-chest in his house, together with elaborate typewritten instructions which he forced his doctor to give him—in case anything awful should happen suddenly. Omega has only to read those instructions, and he could stitch a horrible wound, tie up a severed artery, or make an injection of morphia or salt water. He has a thermometer in every room and one in each bath. . . . You should hear about his insurance. . . . I do believe he was once insured against the eventuality of twins." And when the querist says: "He must feel safe," Alpha replies: "Not the least in the world. Life is a perfect burden to him."

Without drawing too much on our imagination we can picture Mrs. Omega as a most solicitous wife and mother. We can see her watching her husband and children for the slightest manifestation of disease, and with the sort of husband that Mr. Bennett gives her we can easily imagine her a regular attendant at lectures on sexual matters. In a household such as this a common boil on the face is contagious and a sore on the lips syphilitic. Suspicion reigns supreme, no one is trusted, the seriousness of life is exaggerated, and so dismal is the point of view in regard to all who still walk in darkness that it cannot but produce a degree of narrow-mindedness that must eventuate in a distortion of facts.

Are the propagandists really accomplishing what they hoped for? Let us see what headway they have made by putting Brieux's masterly play, "Damaged Goods," on the stage. This play, be it said here, was never meant for the stage, even though the author may have had this idea in view when he conceived the plot, for not only is it devoid of all the dramatic essentials but it sacrifices so much of its real merit by its presentation that the message that is flung over the footlights is a garish monstrosity of thought instead of a sane and thorough lesson that has its lasting effects. But read in the study it is an altogether different matter, for not only can its true worth be understood, but each and every line can

*The Plain Man and His Wife. New York: George H. Doran Company. 1913.

be conned over at leisure, thus separating the grain from the chaff. And yet of the thousands who have seen this play, how many have read it? If more had read it and fewer had seen it, would not the benefits accrued be better, since it is a fact that on account of the presentation so great an upset has taken place in the feminine mind that it is running amuck with an intensity that is quite astounding. The human mind, whether masculine or feminine, is exceedingly friable and breaks under too much pressure, especially if a deluge of new ideas is poured into it when in a state of unpreparedness; and can it be asserted that the feminine mind was in the right receptive state—in an understandingly educated state—when the Brioux performances began in this country? No wonder there are instances, not at all rare, of melancholia in women because they imagine they have been infected by their husbands, or from brooding over the possibility of every servant in the household being a carrier of the disease, or from trying to get at the truth of the real cause of every case of sore throat in the children!

While we are not completely opposed to the modern manner of teaching medicine by spreading our most tempting medical dainties and relishes before the lay mind, ought we not to halt a bit in our wild career as propagandists and just for a moment ask ourselves if we are not taking too much for granted when we conceive the lay mind a prepared soil for our many teachings? Surely it is no intention of the present writer to accuse the propagandists of cowardice, but it does seem to him that this constant shifting of medicine onto the shoulders of the laity at least has the appearance that we medical men are not of the heroic mold. It looks to his unprejudiced view that we are a bit tired of trying to reform mankind and so are telling them in unvarnished terms that they will have to do it themselves. In short, medicine is a failure, morality is the order of the day, and you, my dear patient, must not contract a disease, whether social or unsocial, because medicine is powerless. Do you wish a diversion? Read all the books on Eugenics and the sex question, and when you are sufficiently depressed remember what a help you are to the medical propagandist. Surely this ought to buoy up your spirits.

P. S.

THE DISEASES OF SUCCESSFUL MEN.

The alleged high tension of modern life has been the stock-in-trade of all those who are attempting to explain the assumed increase of certain diseases which were formerly unrecognized; but it is high time to inquire whether there really is any increase of tension. The course of

civilization has been diametrically opposite ever since the time when our prehistoric ancestors never knew where the next day's food was to come from or whether there would be any at all. Besides all that, there was the strain of a constant fear of being murdered when every man carried weapons. Then there was climatic exposure from the crudeness of clothing and shelter, the warfare against wild beasts, the dangers of hunting and the thousand and one things the mere contemplation of which makes one shudder. Taking it by and large, modern life is one of such extreme ease that we give medals of bravery to men for acts which were commonplace everyday affairs to our ancestors. Modern men, like sailors and iron workers whose daily tasks expose them to constant risk of life, do not seem to suffer for it in the least; and even the greatest strains of all, that of locomotive engineers, do not cause their well-known neurasthenia until the beginning of senescence which weakens everybody. Aviation requires young nerves, but so does acrobatics, and one cannot be any more harmful to an elastic nervous system than the other. Boys have always done the tasks which kill the old people; hence, automobiles, submarines and aeroplanes introduce no new principle. Since the maximum life is twice as long as it was a few thousand years ago, it is fair to assume this lengthening to be due, in great part, to lessening of the lethal strains of old. If so, then by making a false assumption that the strains are increasing, we may be ignoring the real causes of modern breakdowns in middle age. But are these breakdowns really more numerous or merely more noticeable than a few centuries back when few great men lived over fifty years and hardly any reached seventy? Much is heard pro and con of the alleged increase of the insane, but other observers account for the fact by the modern prolongation of their lives, and show that our asylum population would be far less than formerly if the patients averaged only three years of institutional life. In addition, the prolongation of life makes a larger number in the decades when insanity shows itself, and they die of that instead of the battle-axe or some plague. And finally, we now confine cases which were formerly allowed at large as mere eccentrics. So we are justified in questioning whether insanity is increasing and whether it is not actually lessening in the decades of life corresponding to the average population of a few centuries back—a lessening due to easing up of the strains of making a living. We read a great deal about the city noises, and in all conscience they are harmful to the sick and feeble; and we are heart and soul with the crusade to abolish the unnecessary ones, but are they as bad for the healthy as we once believed? Some races and tribes have been remarkably strong in places where there is a

deafening roar from surf or wind nearly all the time—night as well as day. It was only a few years ago that the farmers, who lived in greater silence than the city affords, were supplying an undue percentage of the insane, as though they would have been the better for a little noise now and then. In fact, when the usual noises begin to get on a man's nerves we generally consider it a sign of disease due to other causes, and send him out of the noise merely to assist his recovery from the other thing. So let us pause awhile and look into the matter of high tension and see if it is really so.

There is no question that some modern employments such as type-setting and barbering cause a nervous strain by reason of a forced attention, but so did the operation of chipping flints and every other prehistoric undertaking. The modern worker keeps it up more hours per day and does it indoors, so that when eye-strain is added there is ample cause for the periodical exhaustions and final breakdowns. It may be conceded that modern industrialism does in fact find us unprepared for it physically, and there is a rapid elimination of the unfittest and evolution of types able to stand the confinement. Anthropologists the world over are calling attention to the fact that the small brunette people are forcing out of factories the big blond Baltic type, which in turn is taking over the shipping of the world and a good bit of the soldiering, pioneering, and management of big affairs generally.

All this evolution and easing up of strains no doubt permits survival of weak people, fit for a special environment, who would promptly perish in the awful struggle of ancient times, so that we are paradoxically creating weaker types while trying to make it possible for the stronger to live easier. That is, no matter how easy we make the struggle for existence, there will always be a certain percentage unfit for it. As far as one can judge from a very superficial view, this percentage does not vary much from century to century, the only modern difference being that they do not die so promptly but live on in unproductive semi-invalidism. The modern increase of deaths in the later decades of life is thus explained, and not necessarily as due to greater strains.

In a nation of a hundred millions it is quite natural that quite a number of prominent men should die in their prime; but, as far as we can tell, the percentage is less than in past centuries, and infinitely less than when every man died in his prime; and if he did survive to useless senility, which may have been at fifty in those strenuous days, he was mercifully dispatched to get him out of his misery and relieve the tribe of an insupportable burden. Men who work themselves to death are probably very few indeed, and, while we must continue to call attention

to the dangers of over-strenuousness, we should avoid those exaggerations which are becoming so numerous in the press, both lay and medical. Men rust out more often than wear out, and we would be in better business to find the exact causes of death of prominent men and whether the struggle for prominence was one of them. We need not worry over the struggle for mere existence, for that is necessarily wholesome. As a matter of fact, the vagabond who will not or cannot work has the severest struggle of all. Heavy muscular labor, on the other hand, is equally lethal, and clergymen, who are relieved of it, are the longest lived. Successful men of affairs are also almost always relieved of such strains, though they often die of the results of early labors, and perhaps at the same rate as porters, farmers, and mechanics. Their nerve strains seem to be of minor effect, as they are the very ones constitutionally fit for them. The exact causes of death then must be found out, lest we make a fatal mistake of easing up labors which are in fact beneficial. Let our crusade be directed against muscular over-strenuousness whose harm has been amply proved. Hard brain-workers must learn how to relax, and then their labors will do no harm.

NEGLECT OF THE INSANE.

The sanity of the insane, if such a paradoxical expression is allowable, is not receiving nearly the amount of attention from alienists which we presumed it was. The lower animals are so devoid of intelligence that they give no thought to their illnesses, indeed the idea of disease probably does not occur to them. Similarly in men, when first afflicted with mental disease, the higher the intelligence the more surely will the patient think over his own condition. As Dr. Eva C. Reid informed the medical public as far back as 1910, in maniac-depressive insanity there is complete insight in over a third of the cases and partial insight in another third, while it is lacking in a little over one-fourth and these are mostly persons of inferior mentality. The patients as a rule are "keenly alive to their surroundings and the treatment they receive," and they must be treated according to their refinement and mental power, for they bitterly resent injustice, cruelty, insult, or even discourtesy. Moreover, they can often help out in their own treatment by valuable suggestions which the alienist must not ignore as mere delusions. Dr. Reid states that in the maniacal stage restraint seems neither necessary nor desirable, though many cases ask to be secluded. It is also charged that in Spanish asy-

lums cases are still chained down as in medieval days—a fact which should not surprise us in a country still medieval in some ways; but we are amazed and chagrined to learn that the treatment used in some American hospitals for the insane is sufficiently sensational for yellow newspapers. The favorite topic of such news formerly was the charge that a perfectly sane person was being deprived of liberty through a conspiracy of relations wishing to appropriate property to their own uses, but with increasing popular knowledge of insanity these sensational articles fell so flat as to be of no further use in that way, and we now rarely see them. Perhaps now we may expect charges as to improper treatment, and to prevent them we had better put our houses in order at once.

Every hospital should be so managed as to welcome publicity—indeed the more publicity the better—as the lay public should know more of the needs of the insane. The present ignorance causes such a restriction of funds as to render proper treatment impossible, even in some of our states otherwise highly civilized. We have frequently been amazed to learn of deplorable, almost inhuman, overcrowding, and there is no excuse for it.

To this end, it would perhaps be wise to induce more cured cases to give a description of their symptoms and what they desired, at least as much as they can remember distinctly from the jumbled mass of hallucinations and realities. Then the public will learn that if not all, many of the acutely insane do a great deal of clear thinking in spite of the false ideas and hallucinations. Moreover much of their activity is a logical sequence of the false premises, and if we only know the basis for the actions we can make due preparations to prevent harm. All this may seem very trite to our advanced alienists, but from Dr. Reid's charges we must believe that many who are in charge of asylums do not know their business or are so restricted in funds and equipment as to be unable to do what they know should be done. Indiscriminate denunciation is absurdly misplaced in view of the many excellent institutions, so let us have definite facts. Perhaps it would be a wise move for the county medical societies to appoint committees to confer with those in charge of the insane, with a view of publishing the most urgent needs. The chief fault in those states having the best institutions seems to be the utter lack of all machinery for care during the period between arrest and transfer to the asylum. The law rather looks upon the cases as criminals and they are herded with the vicious—a most cruel system for people with keen sensibilities. Surely the country districts can arrange something similar to the psychiatric wards now being established in general hospitals in all larger cities. There is a great work here for the medical profession.

OPINION AND CRITICISM.

AMERICAN SCIENTIFIC STYLE.

Englishmen meeting Americans on the continent of Europe frequently call attention to the glories of the English language as she is spoke by Britishers and to the horrors of the selfsame language as she is spoke by Americans. In medical literature, too, one often sees much matter inviting criticisms of the American style, and one wonders why our journals cannot maintain the standard of English set by many English contemporaries. In fact, medical editors so frequently see evidences of 'poor writing,' that 'poor writing' is almost accepted as a fact and ready explanations are offered for its cause. The lack of preliminary education, the lack of time to adorn weighty thoughts with good clothes, the desire to rush into print in order to beat out the other fellow are offered as a few of the reasons, and probably each plays its rôle. We Americans are supposed to be in too big a hurry to stop the business of life for mere beauty's sake; and if we have a priceless thought to communicate, it would be a foolish waste of time, an interruption of the rush toward other newer and better thoughts to stop long enough to groom our hurrying steed. Many persons, who have not wielded the pen, believe that good writing is a natural gift and that it is the easiest thing in the world for a natural writer to sit at his desk and turn out the finished product in all its beauty. But this is far from true! An article comes to our mind from the pen of Sir Clifford Allbutt, whose use of the English language certainly places him in the front rank of English writers. In this article he states that all his writings are the result of hard work, much thought and even more blue pencilling. Yet anyone who has read his monograph on opium poisoning must agree that for facility of expression, for ease of thought, for force of statement, nothing could be finer. Personal communication from an imported Englishman, very well known because of the strength and beauty of his writings, verified Sir Clifford's experiences on the difficulty of producing good English. Surely we will not dispute the contention that good writing requires much hard labor and much time, and we do believe that the poor style so often seen in American medical literature is due, in part, to the fact that not sufficient time is spent on its production.

But we do not believe that lack of time is the only explanation of the condition. Lack of training certainly is a fundamental evil, and men not trained to write are writing often and much. Our thoughts were

turned in this general direction by the reported commendation of American scientific style by an eminent Frenchman who is supposed to have told his students who were about to write theses, that the very best models of style could be obtained from American chemical journals. If this be true of chemical literature and not true of medical literature, we queried, what is the reason? And we concluded, perhaps erroneously, that chemical treatises are written by men whose preliminary education is good, and who perhaps, not being in the rush of active life, as are medical men, devote much more time to their writing than do medical men. For in this country a chemist must have a preliminary education, which includes a training in literature and in writing—and of course medical standards have not yet demanded solid preliminary education as an essential. Furthermore, the chemist acquires a university habit and when he does write he does it carefully and slowly. By comparison then it seems to us that the causes for so much poor medical writing are easy to find and easy to cure. At least, each man should devote his best to producing good English when he must write; and if his training has not had sufficient academic polish, his thoughts should be smoothed by a strong blue pencil so that they are at least intelligible to the average reader.

BEDBUGS.

However plebeian this title may sound, the prologue to the note sounds so like a fairy tale that it must commence with "once upon a time."

Well, once upon a time a well-known zoologist related a very sad story about a medical colleague who was suffering from many obscure and unusual symptoms which had baffled the keenness of his confrères properly to diagnose and treat. And so, it being fashionable at that time to call all medical obscurities, without local signs, 'neurasthenia,' the poor doctor was carefully labeled a neurasthenic and given judicious doses of suggestion and cold water. But the more neurasthenic he was pronounced the worse he became, and neither could he sleep nor could he eat, and he lost of flesh many pounds, and he became indeed mind-weary and restless. So one night when he was wading in the sloughs of despond he called by telephone upon his friend the zoologist, and requested him to come over to his domicile to console him and to prevent him ending his mortal existence. The zoologist upon learning the whereabouts of his friend's home immediately ordered a taxicab to hurry him to comfort his sorely vexed comrade. And lo! when he arrived there he found his friend sleepless in bed, haggard and weary from many nights of sleeplessness, not knowing what ailed him but complaining of a mighty discomfort. So that he might cheer up the surroundings of the seemingly dying man he turned on all the electric lights in the apartment. Great indeed was his surprise at finding a colony or

two of old friends squatting on the underside of the bed, and when he saw *cimex lectularius*, wisdom came unto him as the Pillar of Smoke unto Moses of old. And with a mighty oath he swore that he of all men could cure his friend, and he gave him a bath and took him to his own home for the night. The next day the bed and its occupants were destroyed, the doctor took to new lodgings and lived happily ever after.

Fantastic as this story sounds, it nevertheless is true and was told to the writer by the zoologist who figures in it.

That bedbugs cause insomnia is by no means unknown; that they may cause insomnia to residents in brown stone mansions without actually revealing their existence is not surprising. But the rôle they may play in spreading infectious diseases is far more important. Recently Sergeois called attention to the experimental work proving the carriage of relapsing fever by bedbugs.

It has already been shown that not only may they carry typhoid bacilli but may infect a second patient. In tropical countries the bedbug has been shown to harbor some spirochætæ and to be an intermediary agent in the transmission of kala-azar, and possibly of plague and trypanosomiasis. Like its brothers in the spread of filth, the bedbug must be considered an enemy to hygiene, and with the fly, the mosquito, the tick must perish before the advance of preventive medicine. The United States cannot ignore the bedbug; typhoid fever is epidemic here, and, as time progresses, more and more so-called tropical diseases are being discovered. We, too, must be 'heroes in the strife.' The example we set in Cuba and Panama to our enemies *anopheles* and *stegomyia* should be followed with a similar urgent lesson to *cimex*.

ORIGINAL ARTICLES.

X-RAY AID IN THE DIAGNOSIS OF CARCINOMA OF THE COLON.

By JAMES T. CASE, M. D., of Battle Creek, Mich.,
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St. Luke's Hospital, Chicago; Lecturer on Roentgenology, Northwestern
University Medical School.

Earlier diagnosis is the goal toward which the progressive medical man of to-day is bending his unceasing efforts. In the early diagnosis of carcinoma of the esophagus and stomach, the roentgen examination has come to be one of the most important factors. The object of the present discussion is to emphasize the value of the roentgen examination as an aid in the early diagnosis of carcinoma of the colon.

The frequency of carcinoma of the colon is relatively not great. In the course of 41,838 autopsies in the Pathological Institute of the Vienna General Hospital between the years 1870 and 1893, there were found 3,585 cases of carcinoma, of which 343 were in the intestine. Of these 343 cases of intestinal carcinoma, 164 were in the colon in general and 162 in the rectum. The probability of discovering a carcinoma of the bowel in the course of a routine examination of the colon is therefore not great, and yet only constant alertness, having in mind the absolute necessity of early diagnosis if the patient is to be cured, will make possible that avoidance of diagnostic sins of omission as regards intestinal carcinoma.

The writer urges a thorough routine examination in every gastro-intestinal case, making the examination just as searching and complete in the case with pronounced symptoms as when the symptoms are not marked. Numerous examples might be cited of successful diagnoses made in this manner where failure would certainly have attended our study had not a thoroughgoing routine been observed.

Roentgen findings in carcinoma of the bowel may be stated as follow:—

1. Delay in the onward progress of the bismuth column following a meal of bismuth-mixed food. The nature of this interference varies with the location of the lesion. For instance, in cases of carcinoma of the hepatic flexure of the colon, the entire residue from a bismuth meal may crowd into the colon proximal to the lesion, with no marked ileal stasis

resulting. This stasis in the colon may vary from forty-eight hours to several days. In some instances the obstruction may be complete. Cleansing enemata ordered to dislodge the stagnant bismuth-mixed residue are less and less successful, according to the degree of stenosis. Often the cleansing enemata fail to ascend the colon beyond the tumor.

2. The introduction of a bismuth clysma into the colon (by the technique to be described later) shows a characteristic arrest in the progress of the bismuth column, a hindrance which may be complete or may be overcome in a long or a short time, according to the degree of stenosis. It is not out of place to urge that the technique of Hæmisch be followed to the very letter, if one hopes for reliable results. The head of the enema column, when it reaches the point of obstruction, may present a funnel-shaped shadow, after which the further filling of the bowel may be impossible, or the bismuth column may after a time again dilate to its normal width. After some delay, the entire bowel may become filled except at the site of the stenosis. When, as is the case in stenosis of the ascending colon, the bowel on the proximal side is not filled completely but presents an irregular cauliflower-like shadow, care must be taken to eliminate the possibility of this appearance being due to insufficient pressure failing to force an adequate amount of bismuth suspension through the stenosed segment of intestine.

Filling defects in the bowel shadow, similar to those produced by carcinoma, may be caused by a fecal tumor, to which the term fecaloma has been applied by certain French writers. This source of error may be excluded by making sure of the thoroughness of the bowel cleansing previous to the examination.

3. A dilatation of the colon on the proximal side of the lesion. This dilatation is not necessarily great and may not be demonstrable during the bismuth examination. When present, it is evidence of a serious obstruction. The colon shadow may end at the obstruction in a funnel-shaped process or there may be an irregular filling defect characteristic of a cauliflower carcinoma.

4. There may be a palpable tumor coinciding with the filling defect. A palpable tumor may not be present, and it hardly would be expected as a constant finding if one hopes to make a diagnosis which is comparatively early. It should be borne in mind, also, that palpable tumors in connection with bowel carcinoma may really be fecal accumulations. At times the dried fecal accumulations in the intestine, proximal to the seat of obstruction, may assume a degree of hardness and resistance to palpation as the tumor itself. One would hardly expect to palpate a tumor, even if present, if it occupied the distal leg of the sigmoid or that portion of the colon which lies above the costal margin. The mobility of the tumor varies, according to the length of the mesentery and the degree of pericolic involvement. Transverse colon and sigmoid colon tumors usually possess the greatest degree of motility, and yet cases of car-



Fig. 1.

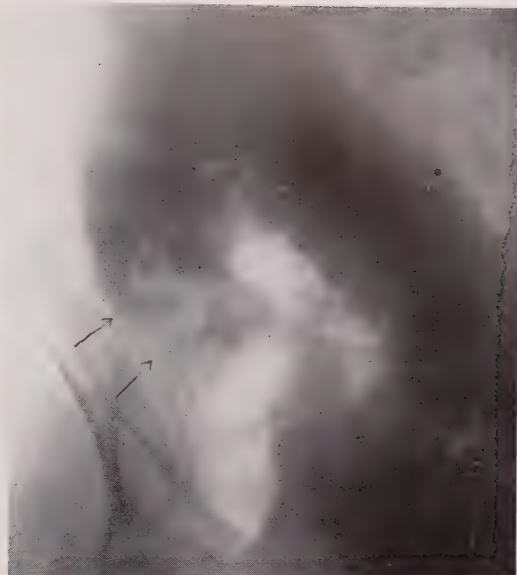


Fig. 2.

Fig. 1.—An ideal colon, bismuth filled, patient lying supine. The figures represent the site of carcinoma in the order of frequency of occurrence.

Fig. 2.—Cecum, ascending and right half of transverse colon, clysma-filled. Note the digitated filling-defect in the cecum, due to extensive carcinoma.



Fig. 3.



Fig. 4.

Fig. 3.—Carcinoma of the ascending colon. Note the filling-defect characteristic of an annular growth. (After bismuth meal.)

Fig. 4.—Clysma-filled colon. Filling-defect in the first half of the transverse due to extensive carcinoma—extension from carcinoma of the stomach. The cecum and ascending colon are only partly filled, due to the difficulty in forcing the clysma past the obstructed zone.



Fig. 5.



Fig. 6.

Fig. 5.—Extensive carcinoma involving almost the entire transverse colon. The peritoneal coat of the bowel and the peritoneum as a whole were studded with carcinomatous nodules. The liver was also involved—all secondary to carcinoma of the stomach.

Fig. 6.—Annular carcinoma of the splenic flexure. The bismuth which is banked up in the dilated transverse colon proximal to the malignant stricture was given one hundred hours previously.



Fig. 7.



Fig. 8.

Fig. 7.—Carcinoma of the descending colon at the level of the crest of the ilium. Note the digitated filling-defect. The colon distal to the obstruction is clysmo-filled. The rest of the bismuth was given by mouth and is scattered throughout the stomach, small bowel and ascending colon.

Fig. 8.—Another case of carcinoma of the descending colon. Again note the digitated filling-defect. The colon distal to the obstruction was filled by clysmo. The cecum and ascending colon contain a small amount of bismuth, held in the most proximal part of the colon by exaggerated antiperistalsis.



Fig. 9.



Fig. 10.

Fig. 9.—Carcinoma of the pelvic colon. Note the stasis above the filling-defect, but without any marked dilatation of the colon as yet. The carcinoma was extensively adherent and a radical operation could not be done.

Fig. 10.—Carcinoma of the pelvic colon. Note the dilatation of the colon above the point of stricture, the bowel still containing bismuth eaten one hundred hours before. This tumor was freely movable and easily resected.

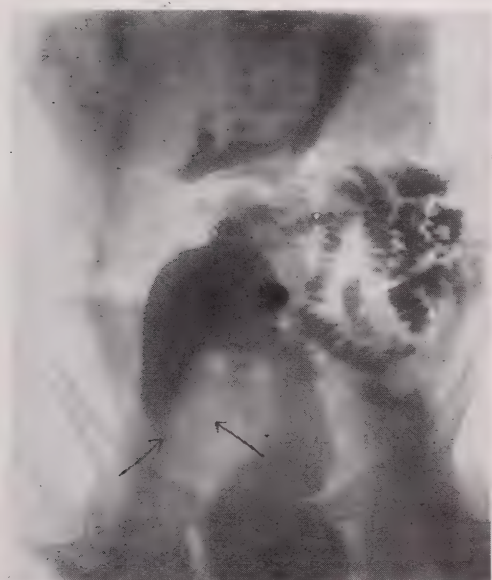


Fig. 11.



Fig. 12.

Fig. 11.—A large carcinoma of the pelvic colon. The rectum, ampulla, and the distal leg of the sigmoid are filled by clysmas. Distal colon dilated in the effort to force the enema past the obstruction. The remainder of the bismuth is in the stomach and upper small intestine.

Fig. 12.—This roentgenogram illustrates the dilatation of the rectum and ampulla in the effort to pass the clysmas beyond the obstruction in the sigmoid.

cinoma of the cecum and ileocecal valve have been seen in which the tumor was exceedingly freely movable. The writer believes that the presence of a palpable tumor should be considered a roentgen sign, inasmuch as the palpation under the fluorescent screen is obviously superior to the ordinary method of palpation.

5. The writer wishes to call attention to what he believes is a valuable sign in the diagnosis of serious colon obstruction—namely, exaggerated antiperistalsis. The prevailing movement in the proximal colon, that is, the cecum, ascending colon, and right half of the transverse, is antiperistalsis, as has been shown by Cannon and others. The writer does not refer to this *normal* antiperistalsis as a sign of bowel obstruction; but, when the normal retrograde waves are *exaggerated*, this fact may be considered a sign of obstruction, analogous to the observation of antiperistalsis in the stomach in cases of pyloric stenosis. The bismuth-mixed colon contents may be found distributed in two zones, a large collection in the distended cecum and ascending colon and a series of bismuth masses in the distal colon, proximal to the obstruction, which, on repeated examination, is seen to be in a state of peristaltic unrest, onward and retrograde persistalsis alternating. The administration of laxatives previous to the examination is likely to increase the probability of observing antiperistalsis.

It should not be understood that the foregoing sign is found only in malignant obstructions. Any kind of bowel obstruction, malignant or benign, organic or spastic, will cause this alternating peristalsis and antiperistalsis with distinctly increased antiperistalsis in a degree varying with the severity of the obstruction.

TECHNIQUE.

The examination should be conducted both following the injection of a bismuth clyisma and following the ingestion of a bismuth meal. Where the symptoms point to bowel obstruction, it is probably more expeditious to employ the bismuth clyisma first.

As the opaque medium for intestinal work, the writer now employs barium sulphate. For the barium clyisma, the ordinary barium sulphate is satisfactory, but for the bismuth meal we have always insisted on using the specially tested barium sulphate prepared by Merck, Squibb or other reliable houses. The writer has used barium sulphate for nearly two years for the clyisma and for over a year as the opaque medium for the test meal. The clyisma employed consists of 90 grm. barium sulphate in 1½ litres of warm water. (To 2½ dr. of gum tragacanth add about 1 oz. of alcohol. Shake well. Add 20 oz. water, shaking well each time. This mixture should be made up fresh shortly before using.) When in haste, 90 grm. of barium sulphate may be stirred into 1½ litres of one of the Oriental clotted milks obtainable in this country under various names. The Oriental clotted milks constitute a better vehicle than the

ordinary buttermilk, retaining the barium sulphate in suspension for a much longer time.

The clysma suffices for studying the mobility and relation of the colon and for determining the competency or incompetency of the ileocecal

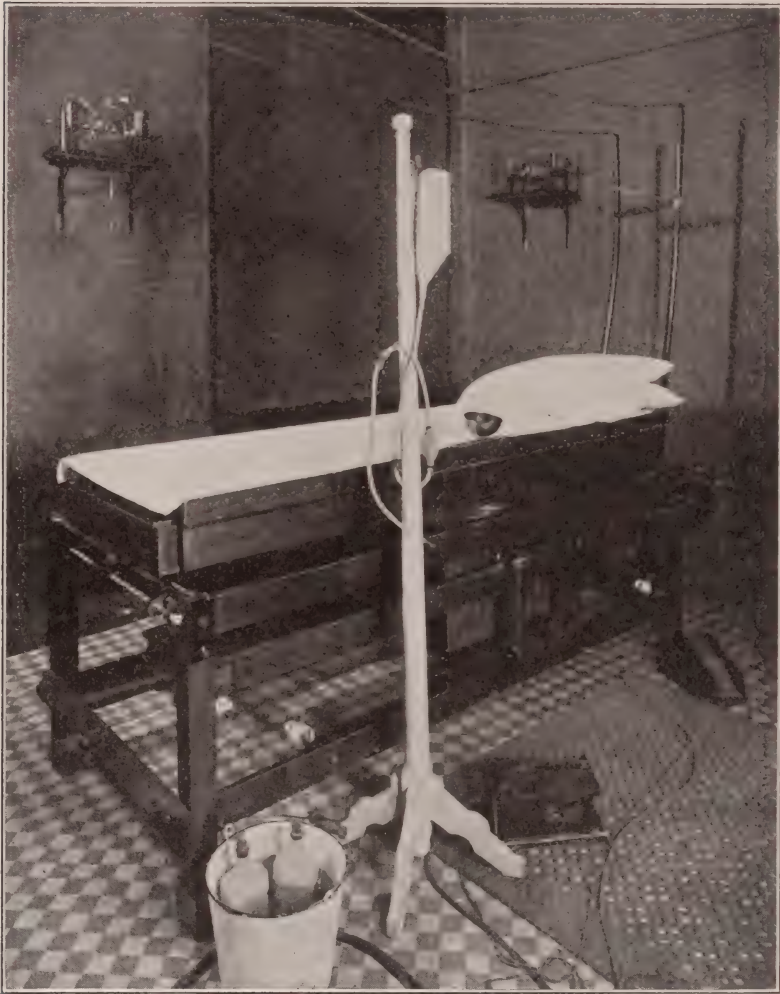


Fig. 13.—The Hænisch trochoscope arranged for colon injection. The patient lies supine upon the table, legs extended, and the screen is allowed to rest on the patient's abdomen, except at special moments during the introduction of the enema.

valve. When a study of the motility is desired, the test meal is preferable.

In a case of suspected carcinoma of the bowel, careful cleansing enemata should be employed previous to the examination. The large

or small amount of cleansing enema the patient with bowel obstruction is able to retain, is often an indicator of the position of the obstruction. The preliminary cleansing enemata should not be large, but the patient should be asked to retain each one for at least five minutes before evacuating.

The use of a trochoscope of the Hænisch type (Fig. 13) or some instrument equally good is a requirement for satisfactory colon study. An easily adjustable diaphragm is especially important. By limiting the illumination to the exact area under scrutiny, one secures a much clearer screen shadow and is enabled to detect small details which, in a larger illuminated field, might be overlooked. The use of the protective apron and gloves is urged. Most essential is a proper protection of lead around the tube. The writer would not feel safe in working with an instrument so insecure that the fluoroscope could be illuminated at any point in the room except directly over the diaphragm opening.

The writer employs a specially constructed fluorescent screen, measuring 14 by 17 in., with a lead-protected border 3 in. wide on all sides. The thickest lead glass obtainable is placed over the screen to protect the face and shoulders of the observer. By means of proper handles, this screen can be placed over the patient at any desirable angle and with any desirable pressure. If preferred, the screen can be suspended above the trochoscope by balanced weight arrangements. During the introduction of the clysma, it is important that the screen should not be allowed to rest heavily upon the patient's abdomen.

Before beginning the fluoroscopic work, the eyes should be prepared by a few minutes' stay in an obscure light, or, better still, in a thoroughly darkened room. One who has not actually tested this can little appreciate the improvement in the fluorescent screen image after a proper preparation of the eyes.

The patient having been prepared, he is asked to lie supine upon the trochoscope, and a rectal point attached to an ordinary enema tube and container is inserted into the rectum. The barium suspension in the container should be placed two feet above the patient and should be allowed to flow by gravity, assisted at the proper moment by manipulating an ordinary bulb syringe. The rectal point should be introduced only past the sphincter—not more than two or three inches. It is not only unnecessary but it is almost impossible to introduce the tube higher into the bowel.

The writer has discarded the use of the colon tube for all purposes. It is impossible, except in the rare cases of megacolon, to introduce a colon tube of any variety without coiling it upon itself in the rectal ampulla.

The colon tube is furthermore quite unnecessary. The writer has given some thousands of bismuth injections with the patient lying supine upon the trochoscope, the rectal point introduced only past the sphincter; and only in cases of actual bowel obstruction has it been impossible to fill the cecum in three or four minutes by the pressure of gravity with the

container at a height of two feet. The temperature of the clysma should be about 100° F.

The progress of the clysma should be watched inch by inch as it ascends the colon. Should it pause in the onward progress, make sure there is not a kink in the rubber tubing or a clogging in the tube. At opportune moments during the inflow of the clysma, manipulation under the screen with the protected hand or with a wooden spoon may elucidate special points. Roentgenograms or tracings may be made at opportune moments to record special phases of the examination.

If there are any suspicious findings, it is especially important that the examination be repeated at some later date in order to place a check upon the findings at the previous examination.

Hænisch advises, after the examination, that the container from which the injection has been made be lowered and the enema allowed to return by gravity. The emptying of the colon is watched under the fluorescent screen and additional information may be obtained as to the exact site of an obstruction. The writer prefers, as a rule, to allow the patient to evacuate the enema sitting upright upon the stool in the usual fashion.

Should a question arise as to whether or not a hindrance is spastic or organic, the administration of 1 mgrm. atropine sulphate hypodermically may serve to rule out the spastic obstruction.

In order to check up the findings in connection with the clysma examination, a bismuth meal examination will frequently be desirable. As a vehicle for a bismuth or barium sulphate meal, one may employ a farina mush or one of the Oriental clotted milks, or the patient may be allowed to take the opaque salt in connection with an ordinary meal. When the stomach is being studied, the writer recommends the use of the Oriental clotted milks or the farina mush, but when the object is to study the lower bowel, the nature of the vehicle is not important.

At the twelfth, the twenty-eighth and possibly also the fifty-second and seventy-sixth hour, the colon should be studied with special reference to a hindrance above the point already under suspicion. A fluoroscopic screen examination is essential for the study of peristalsis, and especially for the detection of antiperistalsis.

THE VALUE OF THE SPINAL FLUID IN DIAGNOSIS.

By CHARLES R. BALL, B. A., M. D., of St. Paul.

The value of the spinal fluid as a differential diagnostic agent is steadily growing in importance. A few years ago the neurologist rarely thought of spinal puncture, but at the present time this procedure is considered necessary as an aid in diagnosis in all obscure nervous conditions.

The technique of spinal puncture is comparatively simple and varies slightly according to the individual preference of the operator. Personally, the writer prefers to have his patients in the sitting posture when making the puncture, if they are able. It has been much easier, in his experience, to penetrate the spinal canal in this position, at the first attempt, than when the patients are in a reclining position. The advantage of entering the spinal canal at once is a twofold one. In the first place, the patient is spared the pain of several unsuccessful trials, and, in the second place, the probability of wounding some small artery or vein and thereby obtaining blood in the fluid is greatly increased. The presence of blood in the fluid, even though small in amount, destroys the value of the globulin reaction (Nonne's Phase I), and, also, makes it uncertain as to whether a lymphocytosis really exists. The point of preference for making the puncture is between the third and fourth lumbar vertebræ, which lies about the middle of a horizontal line passing from one iliac crest to the other. The puncture may be made either exactly in the middle between the spinous processes of these two vertebræ, or slightly to one side. The writer prefers the middle point because the opening between the vertebræ is larger. The minimum amount of fluid necessary for examination purposes should only be taken—6 or 7 c.cm. are usually sufficient. By the withdrawal of so small a quantity of fluid, unpleasant after-effects can usually be avoided. After the puncture has been made the patient should be kept in bed for twenty-four hours as a further precautionary measure. Nonne says to perform a spinal puncture in the consultation room, as has frequently been done, is absolutely to be condemned. The unpleasant after-effects which sometimes follow lumbar puncture are headache, nausea, vomiting, pains in the back of the neck, and stiffness and pain in the back. Experience has shown that tabetics and paralytics are usually free from these disagreeable after-symptoms. On the other hand, patients with functional nervous disturbances may complain of these symptoms for some days afterwards. Experience has shown that lumbar puncture, aside from the possibility of infection, especially in patients with brain tumor, is by no means free from danger.

Some 30 fatal cases have been reported in the literature. The danger in cases with brain tumor may be minimized by keeping the finger over the end of the canula or needle, and instead of permitting the fluid to flow out with a rush, regulating its flow so that it comes out drop by drop, slowly.

The first observation of clinical significance that one obtains in lumbar puncture is in regard to the pressure of the spinal fluid. One can estimate this roughly simply from the rapidity of the flow, from 30 to 60 drops per minute being within normal limits, or more accurately by connecting the canula with a small rubber hose which on its distal end is attached to a vertical glass tube $\frac{1}{2}$ c.cm. in diameter and graduated in mm. The pressure in normal adults is about 130 mm. A variation of 50 mm. may be regarded within normal limits. The spinal pressure can be increased in a multitude of organic nervous conditions, among which meningitis, in all its forms, hydrocephalus, multiple sclerosis, tabes, paresis, spinal and brain tumor and cerebral arteriosclerosis may be mentioned. It is often extremely high in the last-named affection, attaining to 300 mm. Hg. according to Ræcke. This author considers that a greatly increased spinal pressure in the differential diagnosis between tumor cerebri and cerebral arteriosclerosis cannot be regarded as a determining factor.

The next thing of clinical importance to observe is the color of the fluid, whether it is perfectly clear and colorless, or whether it has a yellowish tinge or is milky or cloudy in appearance. An absolutely clear fluid will usually enable one, in acute conditions, to exclude the various purulent forms of meningitis, such as the cerebrospinal, pneumo- and streptococcic. Not infrequently, however, during the early stages of the cerebrospinal form of meningitis, the spinal fluid remains clear, and, where the clinical symptoms cause one to suspect the presence of this disease, a search should always be made for the meningococcus.

The presence of blood may be observed in the spinal fluid in subdural hemorrhage, fracture of the skull, and cerebral apoplexy. Nonne says that it is comparatively easy to differentiate between a recent and an old hemorrhage. In recent hemorrhage the spinal fluid becomes, after centrifuging, as clear as water. Where the hemorrhage has occurred some time before, it presents a light yellow appearance, indicating the presence of hemoglobin. A mistake as to whether the blood is caused by the lumbar puncture or comes from a subdural hemorrhage is scarcely likely to occur, since one can distinguish between the blood produced by the puncture and other recent hemorrhages from the clinical symptoms present previous to the puncture. The yellowish or amber color of the spinal fluid has been called xanthochromia. It occurs in other conditions also where hemoglobin or red corpuscles cannot be demonstrated (Klieneberger, Nonne). It has been observed in compression of the cord, intramedullary tumors and intramedullary syphilis. Nonne says that it appears almost as if a new clinical syndrome, which may be called the com-

pression syndrome, may be spoken of. The syndrome consists in a marked increase of globulin without lymphocytosis, and either with or without a yellow staining (xanthochromia) of the spinal fluid. The significance of this syndrome becomes apparent when one considers how difficult a differential diagnosis between a compressing spinal tumor and a primary disease of the spinal cord often is.

A number of methods have been devised for determining an increase of globulin in the spinal fluid. The one the writer has most often made use of is called the Nonne-Apelt test. He was taught the use of this test in Nonne's laboratory, at the Eppendorfer hospital, in Hamburg, and for this reason feels that he is more familiar with the reading of it than with any other. The test is an extremely simple one to make, but often requires some experience in the reading when weakly positive.

The following is Nonne's description of the test: A hot saturated solution of ammonium sulphate, which has been permitted to cool, is added to an equal quantity of spinal fluid (usually 1 c.cm. of each is quite sufficient). It is advisable to pour one liquid gently on top of the other. If the globulins are increased, there occurs a more or less distinct gray ring at the plane of contact. After this preliminary observation, the mixture is well shaken and the result may be read off within three minutes. A cloudiness or opalescence appearing in the tube inside three minutes is read as positive; according to the quickness of appearance of the opalescence and its intensity, the test is read as weakly or strongly positive.

This test gives us a means, in doubtful cases, in differentiating between functional and organic affections of the central nervous system. Its presence always means organic disease, while its absence, like most negative findings, is not of equal value in absolutely excluding organic conditions. It is almost always found in syphilitic nervous affections. In cerebral spinal lues, according to Nonne's statistics, it is present in about 100 per cent. of the cases, in tabes in from 90 to 95 per cent., and in paresis in from 95 to 100 per cent. It occurs with the greatest intensity in paresis.

The increase in the cellular elements has also a particular significance in diagnosis. For determining the increase of cells in the spinal fluid, the Fuchs-Rosenthal counting chamber is perhaps the best. The chamber of this instrument is 3 c.mm. in size, instead of 1 c.mm., the size of the ordinary blood counter. The counting is performed as follows: The staining fluid (0.19 methyl-violet, 2.0 glacial acetic acid, 50 c.cm. distilled water) is drawn up by the pipette in general use for counting white blood cells to figure 1, and then further filled with spinal fluid to figure 11. After shaking the pipette for five minutes a drop of the mixture is put on the counting chamber and all the lymphocytes and leucocytes in all the squares (25.6) are counted and then divided by 3 to ascertain the number in 1 c.mm. From 0 to 5 cells may be regarded as normal, 6 to 9 as borderland, while more than 10 cells constitute a pathological increase.

Since Alzheimer has devised a new technique for differentiating the character of the cells, a variety of cells has been distinguished. In regard to these cell differences, Nonne says that it is doubtful at the present time whether the recognition of these cell differences will ever become of any practical importance in the diagnosis or prognosis of syphilitic disease. The attempt to recognize in the spinal fluid a characteristic cell picture for the development of a paresis or to foretell the time of progression of a syphilitic affection, has not, as yet, been crowned with success.

What is the significance of the lymphocytes in the spinal fluid? One may say, in general, wherever an inflammation or even a congestion is present in the meninges, a lymphocytosis will be found. It is usually present together with Phase I in tubercular meningitis, poliomyelitis, multiple sclerosis, and in all the nervous affections of specific origin. It may even be found in case of recent syphilitic infection where there are no symptoms whatever to indicate an involvement of the nervous system.

Fränkel has recently reported a case where the initial lesion was still present, in which Phase I was positive and the lymphocytosis was 272/3.

This increase of the lymphocytes in recent cases of syphilis was first called attention to by Merzbacher and afterwards confirmed by Schœnborn and Apelt. According to Nonne's statistics, a moderate degree of lymphocytosis is found in from 30 to 40 per cent. of such cases. Lang, Jarisch and Finger have called attention to the meningeal irritation in the beginning of the secondary period of syphilis. The backache, paresthesias in the upper and lower extremities, weakness and feeling of tiredness in the arms and limbs, slight irritation of the bladder, active skin and tendon reflexes are regarded by these authorities as the manifestation of an inflammatory congestion of the blood-vessels of the spinal meninges. The presence of lymphocytosis in such a large percentage of these cases would seem to confirm this opinion.

When one attempts to draw definite conclusions from the result of these two reactions in the spinal fluid in the light of our present knowledge, failure of these laboratory tests alone, without information in regard to all the clinical facts, becomes self-evident. One could equally with as much right, from any given specimen of urine containing albumin, make a diagnosis of interstitial nephritis as to make a diagnosis of specific nervous disease because of a positive Phase I and lymphocytosis. When, however, the absence or presence of these tests is carefully construed with a full knowledge of all clinical facts, their real significance in the differential diagnosis becomes apparent. For instance, in differentiating between a brain tumor and a case of multiple sclerosis or a specific basilar meningitis, a strong Phase I, with marked lymphocytosis as is almost, without exception, found in the last two conditions during acute exacerbations, would speak strongly against the diagnosis of a tumor. In functional conditions where hysterical symptoms closely resemble organic

conditions, the presence or absence of these two reactions becomes absolutely differentiative. Thus, while no hard or fast deductions, in regard to the presence or absence of these two tests to which no exceptions occur in organic conditions, can be made, their value in differential diagnosis is nevertheless of the greatest importance, and a thorough knowledge in regard to them is absolutely essential to every neurologist who desires to be modern. This same thing applies, with equal force, to the Wassermann reaction in the spinal fluid. It is particularly true when applied to Hauptmann's *Auswertungsmethode*. The general conclusions, with reference to this method, which Hauptmann made at the time his original work was first published, are, in the main, true at the present time. Hauptmann stated at that time that in all cases where larger quantities of spinal fluid up to 1 c.cm. were used, the Wassermann reaction would be found to be positive if the nervous system was affected by syphilis. On the other hand, in all organic and functional nervous conditions not due to syphilis, the Wassermann reaction would be found negative. The only exception which he made to this deduction was in cases of specific arteritis. He reported 5 such cases, and also directed our attention to the fact that in cases of specific arteritis all four reactions may be negative. Since the publication of Hauptmann's work, individual observers have reported from time to time positive Wassermann reactions occurring in cases of tubercular meningitis, and brain and spinal cord tumor of non-specific origin. These cases, in most instances, cannot be said, however, to be entirely free from objection. For instance, Newmark has recently reported 2 cases of non-specific tumor of the central nervous system in which the Wassermann reaction was positive both in the blood and spinal fluid. In both these cases the objection can properly be made that they were not under observation a sufficient length of time to exclude the possibility of beginning syphilitic or metasyphilitic disease, and in neither case was a complete autopsy performed so that syphilis could be excluded from the other organs of the body. Up to the present time in Nonne's laboratory in Hamburg, where the greatest interest in this subject is taken by competent and trustworthy observers, there has been no case either of non-specific tumor of the central nervous system or tubercular meningitis which has given a positive Wassermann reaction in the spinal fluid, even when so large a quantity of fluid as 1 and 1.5 c.cm. was used where the nervous system was otherwise unaffected with syphilitic disease.

The writer has found the four reactions of the greatest value in differential diagnosis. The following case illustrates very well their reliability and worth: A woman, thirty-eight years old, with a definite specific history dating back a number of years; two years before the writer saw her in consultation with Dr. W. A. Dennis had her left breast removed because of a carcinoma. About two months before she came under the writer's observation she began to complain of severe headache and dizziness, staggered when she walked, and later on developed vomit-

ing of cerebral character. When he first saw her, the symptoms were of a fleeting nature, such as syphilis of the nervous system so frequently presents. On some days she was stupid and dull, on other days fairly normal in mental alertness. At one time her patellar reflexes would be unusually active and at another, several days later, gone entirely. The four reactions in this case gave the following results: Wassermann reaction in the blood moderately positive; Phase I strongly positive; lymphocytosis 230/3; Wassermann reaction in the spinal fluid with 1 c.cm. of fluid, negative. Because of the negative Wassermann reaction in the spinal fluid, the writer made the diagnosis of malignant metastasis of the central nervous system. The subsequent history, as well as the autopsy, confirmed this diagnosis.

The most important observation which tends to detract from Hauptmann's original conclusions has been reported by Fränkel from material in St. George's Hospital in Hamburg. Fränkel selected 15 cases of recent, untreated syphilis in which there were no pathological symptoms referable to the nervous system. In these cases, the four reactions were very carefully made. In 5 of the cases, 33 1/3 per cent., the Wassermann reaction in the spinal fluid was found to be positive with varying quantities of fluid: 2 cases when 0.3, 2 cases when 0.5 and one case when 1 c.cm. of fluid was used. In one of the cases three days after the administration of neosalvarsan, epileptiform attacks set in, followed by three days of coma and then exitus. Both macroscopically and microscopically no changes either in the brain or spinal cord of a specific nature could be demonstrated. The question which naturally arises in these cases is whether these antibodies present in the spinal fluid filtrated out of the blood into the fluid or whether they originated there primarily as the result of a specific infection somewhere in the nervous system. The autopsy in the case which died would seem to indicate that the presence of the antibodies in the spinal fluid was due to filtration out of the blood-serum. The writer thinks we are justified in assuming that during the course of severe infections the blood-vessels of the spinal and cerebral coverings are often congested, as various symptoms, such as headache, backache, delirium, muscular twitchings, etc., show, thus presenting a condition which would be more favorable than normal for the occurrence of filtration from the one fluid to the other. Recent experiments have also demonstrated the rapidity with which toxic substances in the blood find their way into the spinal fluid. Is it not, then, extremely natural to suppose that the spinal fluid of an individual whose blood-serum is saturated with antibodies would absorb a certain number of these antibodies varying in degree with the intensity of the saturation in the blood-serum? One might still pursue this question further and ask if it is an actual fact that an exchange of antibodies takes place between the blood-serum and the spinal fluid in recent cases of syphilis? And could not this exchange also occur in any case of syphilis whether recent or late? In all probability it

can and does, but in late cases of syphilis ordinarily the exchange of antibodies between the blood-serum and the spinal fluid is so slight and, consequently, their presence in the latter so few in number, that in quantities of the spinal fluid up to 1 c.cm. so small an amount of complement is bound as to render their presence negligible. There are numerous other questions which arise out of this observation of Fränkel's, which only further experience and a longer time for observation can definitely settle. For instance, one would like to know if those cases of recent syphilis which give a positive Wassermann reaction in the spinal fluid are more apt later on in life to develop syphilitic and metasyphilitic disease of the nervous system; also whether the presence of these antibodies in the spinal fluid is caused by the intensity of the infection or is due to an inherent weakness in the protecting meninges.

A brief statement of Hauptmann's conclusions with regard to the value of his *Auswertungsmethode* in diagnosis will aid in dispelling some of the confusion which seems to exist in regard to them.

Hauptmann says, first, that by the use of this method we are able at the present time to exclude a specific basis in symptom-complexes which resemble cerebrospinal lues, such as multiple sclerosis, tumors, abscesses and cerebral hemorrhages; secondly, in multiple sclerosis, although the Wassermann reaction in the blood may be positive, and clinical symptoms, such as pupil anomalies, are present, we need never confuse the diagnosis if the Wassermann reaction in the spinal fluid is negative; thirdly, in cases where one is suspicious of paresis, a negative reaction will distinguish a syphilitic neurasthenia from an incipient paresis or a positive reaction enable us to recognize the very earliest stages of the latter affection.

Nonne, in his book, "Syphilis and the Nervous System," says that the results of the four reactions are especially valuable in differentiating organic disease of the nervous system as a consequence of alcoholism. It is well known how much pseudotabes alcoholica and pseudoparesis alcoholica can resemble the syphilogenetic tabes and paresis, and with syphilis in the anamnesis, as is not infrequently the case, such a distinction becomes still more difficult.

The testing of the four reactions is also important as a guide in the treatment of any case of nervous syphilis. One can observe their gradual disappearance in favorable cases or increase in intensity in unfavorable ones. Only when all four tests become negative are we justified in speaking of a complete cure.

Nonne's own statement in regard to the value of these reactions in diagnosis best expresses it. He says that "owing to numerous errors, it follows that even if one uses all the four reactions one has still to observe the greatest caution in diagnosis. If the observer does not wish to run the risk of grave diagnostic errors, he has still to apply a careful and detailed clinical examination in each individual case."

BIBLIOGRAPHY.

Nonne: Syphilis and the Nervous System.

Ræcke: The Early Symptoms of Arteriosclerotic Brain Disease. (*Archiv fuer Psychiatrie und Nervenkrankh.*, Band 50, Hft. 2, p. 476.)

Nonne: Further Experiences in Regard to the Diagnosis of Compressing Tumors of the Spinal Cord. (*Deutsch. Zeitschr. fuer Nervenheilk.*, Bd. 47 and 48, p. 437.)

Fränkel: Further Observations in Regard to the Reasons for the *Auswertungsmethode* of the Wassermann Reaction in the Spinal Fluid. (*Zeitschr. fuer die gesammte Neurologie und Psychiatrie*, Bd. XI, Hft. 1, p. 1.)

Newmark: The Occurrence of a Positive Wassermann Reaction in Non-Syphilitic Tumor of the Central Nervous System. (*Journ. Amer. Med. Assoc.*, Jan. 6th, 1912.)

Hauptmann: The Advantages of the Use of Increased Fluid (*Auswertungsmethode*) in the Wassermann Reaction for Neurological Diagnosis. (*Deutsch. Zeitschr. fuer Nervenheilk.*, Bd. 42, p. 241.)

ON DIGITALIC ACID, THE ACID RESIN OF DIGITALIS PURPUREA—ITS PREPARATION, CHEMICAL REACTIONS, PHYSIOLOGIC AND THERAPEUTIC PROPERTIES.

Le seul médicament cardiaque est la digitale. Huchard, *Nouvelles Consultations Medicales*.

...les médicaments sont des outils dont il faut savoir se servir et en thérapeutique on doit se convaincre de cette vérité: Tant vaut l'ouvrier, tant vaut l'outil. Huchard (*ibid.*).

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PREFACE.

This work is an attempt to discover the real active principle of digitalis purpurea—the chemical compound that makes the foxglove of such transcendent value in medical practice.

This labor is free of speculation and theory except such as appear as conclusions from observed effects. Of these there is one that is entertaining and seductive—namely, that the regulated strength of the heart muscle and the gastro-enteric irritation from digitalis are different results from different substances peculiar to the plant, that the poisonous action is least from the proximate principle that acts upon the heart best.

Finally, that as experiment is always better than precept, it is earnestly requested of physicians engaged in applied therapeutics to submit the main deduction of this study to trial in practice—a daily hypodermic injection of digitalate of sodium for two or three days in any severe or grave case of heart insufficiency with the distressing symptoms of cardiac asthma or asthma humidum or cardiac dropsy.

SYNOPSIS.

I. The active principle of digitalis purpurea is the acid resin here called digitalic acid.

II. Methods of extracting digitalic acid and preparation of the digitalate of sodium.

III. (a) The physical properties and chemical reactions of digitalic acid and of digitalate of sodium.

(b) The color reactions of digitalic acid with mineral acids.

(c) Identification of digitalic acid in the infusion of digitalis.

(d) Identification of digitalic acid eliminated in the urine.

IV. Effects of digitalate of sodium on cut leaves and flowers and upon growing plants.

V. Experiments with digitalate of sodium upon common insects, the crayfish, the minnow of the goldfish, the tadpole, and the frog—*rana virescens*.

VI. Action of very large doses of the digitalate of sodium upon the domestic cat, white rabbit, and the guinea-pig. Demonstration that digitalic acid in the guinea-pig always arrests the left ventricle in bloodless systole.

VII. Diseases illustrative of the use of the acid resin and of digitalate of sodium.

VIII. On how to use digitalis with safety and the dose and modes of administering digitalic acid and digitalate of sodium.

I. Ever since the introduction of digitalis purpurea, the foxglove, into practical medicine, by Withering, it has been the subject of constant study and investigation by medical men as to its habitat, preparations, its Galenical forms, dose, harmful properties, its chemistry, active principles, therapeutic and physiological actions.

No one, after impartial use of it, has doubted its powers of action in disease. The conviction must remain with every one that for certainty of action and efficiency it is and always will be without a compeer or superior in the restoration of an enfeebled vascular circulation to a state approaching or reaching that of health.

In achieving this effect the same is directly and primarily accomplished by its power to uplift the strength of the heart ventricle. This it does as long as the heart muscle contracts, be its enfeeblement from almost any cause: an intrinsic metamorphosis, the muscle degeneration of disease, the paresis of nerve mechanism, or the enfeeblement of vital force.

Its power is displayed not only in the heart defects of direct disease, but in many acute and chronic systemic affections in which the circulation is languid and slow.

The search for betterment or accuracy in the preparation of the drug has led to a long but not completed quest for the real active principle, and has caused much labor and time spent to isolate the one body possessing the intrinsic medicinal virtue of the plant. The several glucosides, discovered and isolated, which act like digitalis upon the heart of the experimented animal, have not, however, found any general acceptance in medical practice as a substitute for the older forms of administration, either as regards simplicity or efficiency. So far they have not been found to be any better than the infusion or powder used by Withering; by some they have been declared to be inferior. These proximate principles have chiefly failed to win the confidence of physicians, because of the impossibility of using them systematically by hypodermic injection from their proneness to abscess production.

Furthermore, it seems evident that the heart effects of digitalis may not necessarily be special or peculiar to these proximate principles of the plant, which are locally violent irritants and which produce the poisonous gastro-enteric action of foxglove, or the collapse state of cumulative action.

These facts are the cause of this experimental study, undertaken with

the knowledge that in the leaf of the foxglove there is found a resin to which its fine green color, when dried, is due: a body sometimes confounded with chlorophyl and cast aside by chemists and experimenters, without trial, as inert.

This unnamed acid resin, from its importance as a constituent of the plant, deserves the recognition of a title in chemical nomenclature, and is, therefore, here called digitalic acid.

Theoretically, it may be considered the mother source of the various principles found in digitalis: digitalin (digitoxin), digitalinum verum, digitalein, digitin and digitophyllin. It has been assumed, perhaps without proof, that a reverse order in the genesis of these compounds takes place and that the acid resin is a product of the decomposition of these glucosides. Whilst this may be a product of hydrolysis or chemical dissociation, it is not compatible with the life history of the growing plant, with chemical quantitative analysis, with chemicophysical reactions, or with pharmacological dynamic effects.

These various constituents have this in common: the specific reaction of the heart ventricle, to their application, in slowing its contractions. Some have also marked poisonous properties of irritation, not on the heart muscle, for diminution of the pulsations or even heart arrest is not primarily a poisonous action but of local reaction.

The acid resin is the least poisonous of these bodies, and is therefore the purest in its effect to produce a digitalis heart. Experimenters, in overlooking heretofore the possibility of the acid resin being the essential active principle of the plant, were probably unconsciously misled in the long and multiplied search by the assumption that this compound must be an alkaloid, then a glucoside, then a nitrogen-free substance, and that a crystalline structure had to be an absolute *sine qua non* of purity, chemical stability and therapeutic activity.

II. Digitalic acid can be prepared in several ways:—

1. By extracting the powdered leaves with sulphuric ether. The macerations must be repeated for about a week, drawing off the liquid every day or two and replacing it with fresh ether until it recovers a pale green color. The first portion of fluid removed is of a green-black color; by repeated maceration it lightens considerably.

The combined liquid is removed by evaporation in the open air, or by distillation. The impure resin remains as a soft solid, black in mass and with a strong odor of the dried plant. Instead of maceration, percolation may be used if more convenient or if time be limited.

The yield of a number of resin extractions of the drug from different drug houses varied much in weight. Thus, one pound of powdered leaf extracted with five pounds of ether: First sample, 249 grains; second sample, 215 grains; third sample, 210 grains; fourth sample, 260 grains; fifth sample, 230 grains.

2. The resin can be obtained from a fluid extract by evaporation, add-

ing purified animal charcoal until a soft, solid mass is made, continuing the drying by exposure to the air or a temperature of 100-110°F. When dry and granular, ether is then used as in the first method.

3. A pound of the powder of the leaf is digested with a strong solution of four ounces of sodium hydrate in water. It is well stirred, allowed to stand for a day, and is then diluted with water until it allows of filtration or straining through a fine wet cotton cloth.

Dilute sulphuric acid is added to a degree of marked acidity. The acid resin separates in the form of a fine flocculent green precipitate. The sediment having formed after some hours, the clear fluid is poured off and the vessel refilled with cold water and set aside for sedimentation. This process is repeated until the final washing is clear and colorless.

The acid resin thus prepared is a grey-green light mass quite different from that made by ether extraction. Neither is in a state of great purity but sufficiently so to be used in medical practice to produce all of the characteristic heart reaction of the plant.

The digitalate of sodium is the salt prepared from the acid resin and is thus produced:—

1. The impure resin is treated with one-third its weight of sodium hydrate by trituration, and water is added in small amount until a solution of all the resin is accomplished. This is filtered and set aside for evaporation at ordinary temperatures or better at a temperature of 100°F. The procedure should be allowed five to seven days. The solidified residue is a dark green with long, white, radiating or fan-shaped crystals. When fully dried, it is powdered and treated with sulphuric ether until this comes off colorless. The ether extract is of a golden yellow color and contains digitoxin and digitalis resin, but no digitalinum verum or digitonin.

The residue is then treated with 95 per cent. alcohol, repeated until the digitalate is wholly dissolved. The first portions are black, the last a perfect blue and green. The considerable residue undissolved is mainly sodium carbonate. The mixed and filtered solutions are evaporated with very gentle heat. The digitalate remains as deep green—non-crystalline lamellæ of considerable lustre. Its aqueous solution is a greenish-blue.

2. When the digitalate is prepared from the acid resin precipitated by H_2SO_4 from the alkaline solution of the powdered leaf, the resin first obtained is well washed with water, dried, washed lightly with ether,* again dried, combined with caustic soda, again dissolved in water, slowly evaporated after filtration, well washed and extracted with ether to remove digitoxin, dissolved in alcohol, filtered and evaporated. The digitalate of sodium by this method is less in weight than that prepared by the former, and is a very light and fine powder of a pale fawn color. Its watery solution is a very pale blue. One grain is sufficient to give a tint of color to four fluid ounces.

*Instead of washing with ether, chloroform or carbon disulphide may be used. Digitalic acid is insoluble in both.

The impure resin was used in practice in many cases for internal administration. The digitalate of sodium was likewise used in this manner.

The aqueous solution of the digitalate of sodium was used in all the various physiological experiments and chemical tests and in the hypodermic form in the clinical ambulatory trials.

III. The physical properties and chemical reactions of digitalic acid and of digitalate of sodium as observed in this study are the following:—

Digitalic acid, when freshly prepared by decomposition of the digitalate of sodium, is in moist yellow grains which are soluble in alcohol, to which they give a bright yellow color. Its reaction is acid. Evaporated upon a cupped slide and examined under the microscope, no forms of crystals are seen.

Digitalic acid heated in a test-tube gives off white fumes of a resinous odor, swells up, and is carbonized and finally disappears without residue or ash.

In the spectroscope the aqueous solution of the green digitalate entirely absorbs the violet rays; the fawn-colored digitalate and the alcohol solution of digitalic acid likewise shut off the violet rays, but less profoundly: the black bar is much less intense.

Digitalic acid does not possess strong affinity for bases, and its combinations are readily broken up. This is confirmed by a variety of facts in its behavior and properties. It does not seem to have a crystalline form. It is prone to change of color. In the plant it is broken up by ferments, moisture and sunlight. It is very well known in pharmacy that the dried leaves are not well preserved after a year, and that the stock of them should be renewed within that time. The deterioration and inertness of digitalis on keeping is a clear though indirect proof that the acid resin is the true active principle. The digitalate of sodium in its two forms, fawn color and green, is stable enough when kept in solution and is not liable to grow fungi and micro-organisms; yet it is readily broken up by any acid, even the carbonic, for when kept long in the dry state and exposed to the atmosphere, its solution effervesces on the addition of a mineral or vegetable acid.

Digitalic acid, as to its solubility in all of the ordinary solvents, was determined in the following manner. The solvents were arranged in numbered test-tubes, and to each one three drops of an alcoholic solution of the acid were added. The clearness and color of each fluid were noted, and also the next day when 6 drops more of the solution were added to each tube. Thus transient, slight, or great insolubility could be perceived.

Acetic ether dissolves digitalic acid.

Amylic alcohol " " "

Alcohol " " "

Anilin oil " " "

Methyl-alcohol " " "

Benzene (petroleum) insoluble as an oil at bottom.

Carbolic acid dissolves digitalic acid.

Carbon disulphide	completely insoluble.
Chloroform	" "
Castor-oil	dissolves digitalic acid.
Creosote	" " "
Ether (sulphuric)	" " "
Glycerine	" " "
Hydrogen peroxide	" " "
Oleic acid	" " "
Oil of turpentine,	insoluble.

Water seems to dissolve the acid as far as ordinary light and vision can perceive. If, however, the test-tube containing the apparent solution be boiled, a mote-like precipitate appears on cooling, and on reboiling and cooling the separation is apparent as a fine blue-white flocculent haze.

The digitalate of sodium has two distinct forms of color. The one prepared by the process in which the impure resin is washed with ether is a very fine light powder of a fawn-yellow hue. It dissolves readily in water, which it colors a very light yellow-green. Its reaction is neutral; its taste neutral or insipid. The agitated water solution foams but little. In 95 per cent. alcohol it dissolves slowly. Three drops of this solution on a cupped slide and allowed to evaporate spontaneously leave an amorphous residue.

The digitalate of sodium of the second process is a dark green salt in shining scales when in thin layers. It is readily soluble in water, yielding a dark green opalescent solution which foams markedly by shaking. Its reaction is neutral; its taste neutral or insipid.

It dissolves slowly in 95 per cent. alcohol, and this solution evaporated in a cupped slide yields an amorphous residue. When the fawn-colored salt is heated on platinum foil, a snow-white vapor is given off, an odor of burnt straw is perceived, and a small amount of white ash remains. The same salt heated in a dry test-tube evidences the same appearances: vapor, odor and ash; a small amount of oily fluid sublimes.

When the green salt is heated on platinum it becomes carbonized; heavier fumes appear, partaking of a stronger odor of burnt straw or oil, and a shell of carbon remains.

The same salt heated in a dry test-tube evolves a white vapor, the same burnt odor as the preceding, watery vapor condensed on tube above and black oily drops below it. The ash is a shell of carbon; by continued combustion the remaining powder is snow-white.

This incineration shows the fawn-colored, purer salt, free of water and probably of contaminating oil or fat.

The solubility of the green digitalate was tested in the same manner as that described for digitalic acid. The solvents were the same:—

Acetic ether	dissolves the digitalate.
Amylic alcohol	" " "
Alcohol	" " "
Anilin oil	" " "
Methyl-alcohol	" " "

Benzine (petroleum), insoluble, oily precipitate.
 Carbolic acid dissolves the digitalate.
 Carbon disulphide, very insoluble.
 Chloroform, " "
 Castor-oil dissolves the digitalate.
 Creosote " " "
 Ether (sulphuric), 3 drops soluble, 6 drops very fine precipitate.
 Glycerine dissolves the digitalate.
 Hydrogen peroxide insoluble, fine precipitate.
 Oleic acid dissolves the digitalate.
 Oil of turpentine, insoluble, oily precipitate.
 Water readily dissolves the digitalate.

The cursory effects of treating an aqueous solution of the green digitalate with the usual laboratory reagents are here recorded:—

With ammonia water 0.
 Ammonia sulphide " "
 Bromine water " "
 Baryta water " "
 Copper sulphate " "
 Calcium chloride " "
 Chlorine water, white precipitate.
 Ferric chloride acid, precipitate, a cloud, neutral 0.
 Ferric sulphate 0.
 Gold chloride " "
 Hydrogen peroxide, decolorized with effervescence.
 Hydrogen sulphide 0.
 Iodine and potassium iodide " "
 Indigo solution " "
 Lead acetate " "
 Lead subacetate, green precipitate.
 Lime water 0.
 Meyer's reagent HgCl_2 and KI " "
 Mercury bichloride " "
 Manganese chloride " "
 Magnesia sulphate " "
 Picric acid " "
 Potassium ferrocyanide " "
 Potassium ferricyanide " "
 Silver nitrate " "
 Strontium chloride " "
 Tannin " "
 Tartaric acid " "
 Zinc sulphate, precipitate doubtful.

These reactions are, however, changed in greatest number when the solution of the fawn-colored salt is used, it being a very pale green-yellow solution, not opalescent as is the green, when each test is applied in the cold and then by boiling. Thus the ordinary insoluble compounds of resin acids appear with striking uniformity:—

Barium chloride and green digitalate in the cold, 0; by boiling, a precipitate.
 Baryta water with the fawn-colored solution in the cold, a precipitate; with the green solution, only on boiling.

Aluminum and potassium sulphate, green digitalate cold, precipitate heavy. Fawn digitalate cold, faint precipitate; boiling increases it.

Calcium chloride with the green solution on boiling, no precipitate.

Chloral hydrate, green digitalate cold, 0; boiled deepens its color. With the fawn-colored digitalate cold, 0; boiled, 0.

Copper sulphate with the green, on boiling, a precipitate. With fawn-colored digitalate cold, 0; boiled, 0.

Ferrous sulphate with the fawn-colored solution in the cold, 0; boiling, rusty red precipitate. Ferrous sulphate with the green in the cold, 0; boiling, rusty red precipitate. Ferric sulphate with the fawn in the cold, 0; on boiling, red precipitate.

Ferric sulphate with the green, the same.

Iodine test solution with potassium iodide with the fawn solution and the green, cold or boiled, no precipitate.

Lime water with the fawn solution in the cold, a precipitate; the green on boiling, a precipitate.

Magnesium sulphate with the green solution, on boiling, a faint precipitate.

Mercuric chloride with the green in the cold, clear; on boiling, a precipitate.

Silver nitrate with the green solution in the cold, clear; on boiling, a yellow precipitate.

Silver nitrate with the fawn in the cold, a white precipitate; on boiling, a yellow precipitate.

Gold chloride with the fawn-colored salt in the cold, 0; heated, 0.

Gold chloride with the green salt in the cold, 0; heated, precipitate.

Ammonium sulphide fawn in the cold, 0; heated, 0.

Ammonium sulphide green in the cold, 0; heated, 0.

Picric acid with the fawn cold or heated, 0.

Picric acid with the green cold, 0; heated, a precipitate.

Potassium ferrocyanide with the fawn or green cold or heated, 0.

Potassium ferricyanide, fawn salt, cold or heated, 0.

Potassium ferricyanide, green salt, cold, clear; heated, 0, but change of color from yellow to deep green.

Tannin with the fawn salt, cold or heated, 0.

Tannin with the green salt, cold, 0; heated, a precipitate.

Tartaric acid, fawn salt, cold or heated, 0.

Tartaric acid, green salt, cold, 0; heated, uncertain.

Zinc sulphate, fawn salt, cold, 0; heated, a precipitate.

Zinc sulphate with the green salt, cold, 0; heated, a precipitate.

When solutions of digitalate are floated upon different strong acids, and when these fluids are combined by shaking, different colors appear with considerable vividness. Thus, when a solution of a few grains of the green digitalate in water is poured with a pipette upon the acids below mentioned, there results:—

From sulphuric acid, a deep green upper zone.

From nitric acid, a brown red zone.

From hydrochloric acid, a deep green zone.

From acetic acid, a light green coloration with a white middle band of precipitate.

After standing some time for the colors fully to develop, and the test-tubes then shaken, there result:

From sulphuric acid, a deep green color.

From nitric acid, a pale brown color.

From hydrochloric acid, a green color.

From acetic acid, a pale green color.

When the light-colored digitalate is used in water solution, there result:—

From the sulphuric acid, a lower ruby red zone.

From nitric, colorless.

From hydrochloric, pale green.

From acetic, colorless.

On agitation the sulphuric acid becomes a beautiful pink; nitric acid a very pale green; hydrochloric acid, pale green; acetic remains colorless. When the green digitalate is used dissolved in alcohol with sulphuric acid, it is ruby red below, green above; with hydrochloric acid, green; with acetic acid, white band, above green. With the light-colored digitalate in alcohol there results with sulphuric acid, a beautiful ruby red band, above colorless; with hydrochloric acid, a pale green; with acetic acid, colorless. The nitric acid is omitted in the latter, as admixture results in explosion. When the green digitalate is agitated the sulphuric acid tube is a beautiful clear ruby red; the hydrochloric acid, a fine green; the acetic acid, a pale green. The light-colored digitalate on shaking gives with sulphuric acid a clear ruby red; with hydrochloric acid, a pale green; with acetic acid, colorless.

These color reactions with strong acids are of considerable interest. They are very distinct and prompt and leave no doubt as to the certainty of the appearance. Yet the digitalin of Homolle, the crystalline digitalin of Nativelle, and the digitoxin of Schmiedeberg give a fine green coloration with hydrochloric acid and a red coloration or zone with sulphuric acid, with or without a ferric salt, as does the digitalinum verum of Kiliani. Hence, these various colorations are misleading and cannot identify the glucosides of digitalis unless the acid resin—digitalic acid is completely excluded.

The acid liquids of the foregoing color experiments, when set aside for a day or two and then tested for glucose with Fehling's copper solution, show the presence of glucose distributed in this manner: Most glucose in the alcoholic green and fawn-colored digitalates with sulphuric acid; the same with hydrochloric acid; with acetic acid, none at all; more glucose with the aqueous green and fawn-colored salts with sulphuric acid than with nitric acid, more with nitric acid than with hydrochloric, none at all with acetic acid.

This observation proves that the resin of digitalis—digitalic acid—yields glucose with strong, mineral acids as do all glucosides.

DeJean* found the coloring matter of alkanet (*Alkanna*, *Anchusa*, *tinctoria*) very useful to identify toxiresin in his numerous analyses of digi-

*DeJean: *Etude pharmaco-chémique comparée sur la digitale sauvage*, etc., 1908.

talis and digitalins. When the tincture of alkanet acidulated with acetic acid is added to a resin, resin acid, or resinoid, there occurs fixation of the dissolved coloring matter. This fixation of the coloring by a resin is sufficiently prompt and accurate to be a more or less useful and reliable test. With digitalic acid, alkanet acts as follows: Digitalic acid in alcohol with tincture of alkanet, a clear burgundy red; this with acetic acid does not give the reaction. When the digitalic acid is added to the tincture, or when the acid is first suspended in water, the fixation occurs very promptly.

The green digitalate of sodium in water with tincture of alkanet shows a fine Burgundy red; with acetic acid added, a turbid red and soon a red flocculent precipitate; the supernatant fluid becomes decolorized.

The aqueous fawn-colored digitalate with the tincture of alkanet shows a brilliant purple; with acetic acid added, a turbid red. Fixation of the coloring appears more slowly than in the green salt, developing fully a day later than the other.

That the acid resin is present in the infusion of digitalis can be readily demonstrated chemically by the alkanet test and by the color reactions with mineral acids. The infusion is acidulated with acetic acid and well shaken. A cloud-like precipitate forms which is suspended in the fluid for days. Filtered through a fine, white filter, nothing visible remains. The filter washed with a weak solution of sodium hydrate gives a solution the color of the infusion. The digitalate of sodium, thus obtained, readily causes fixation of alkanet coloring when added to the tincture acidified with acetic acid.

Some of the digitalate is floated in test-tubes over strong sulphuric and hydrochloric acids. An upper green band appears in both tubes. On shaking, the hydrochloric acid tube is a pale yellow green; the sulphuric, a deeper green; on standing a day or two the green colors deepen.

Digitalic acid is eliminated unchanged in the urine and can be readily detected in the following manner. The urine secreted after a hypodermic injection of the digitalate of sodium is collected to the amount of a pint or more. It is boiled and filtered. To the filtrate, tincture of alkanet is added with a free addition of acetic acid. It is allowed to stand a little while and is then passed through a small white filter. The dried filter is washed with a weak solution of sodium hydrate which is collected. Acidulated with acetic acid, a cloudy red precipitate of the acid resin forms, fixed by the alkanet. This is collected on a small filter, and dissolved by passing alcohol through it which yields a red solution. The red solution floated on H_2SO_4 gives a faint red band and color.

Floated upon HCl it gives a faint green band. The H_2SO_4 tube allowed to stand for a day and then agitated gives a red color; the HCl tube, a more positive green reaction than the color band. The tubes neutralized with caustic soda give a still more pronounced red with H_2SO_4 , a still more pronounced green with the HCl .

The results are the more striking and positive the larger the quantity of urine tested.

The same results as the above are found where a small fraction of a grain of digitalate is dissolved in normal urine and subjected to this procedure for extracting digitalic acid.

IV. The effects of a solution of digitalate of sodium upon the cut leaves and flowers of wild and cultivated plants were tested in a number of examples and showed with very few exceptions the same to be poisonous in a marked degree. The strength of the solutions was 1 to 240 and 1 to 480. The cut plant was immersed to one inch or more of the stem in a half-ounce vial, and a second part of the flower or leaf of very similar size, color, and appearance was placed in a second vial of river water. A comparison of changes in appearance could thus be readily made. Actions observed on growing flowers and slips kept in flower-pots were also noted. The plant tested was watered at its base daily for a given time with 1 grain or less of the digitalate dissolved in one fluid ounce of river water. The plant for comparison was daily treated in a like manner with potable water.

Achillea millefolium, common yarrow, the leaf, 1:480 digitalate; in seven days, black and shriveled; in seven days the comparison, fresh and green.

Adiantum pedatum (fern), maidenhair, 1:480 digitalate. In seven days, dry, yellow, grey. The comparison green.

Aster concolor, starwort, the flower, 1:480 digitalate. In seven days, the stem shrunk, the flower much faded and reduced to one-half the size of the comparison which is slightly wilted.

Buxus sempervirens, the box, 1:240 digitalate. In fourteen days, leaf dry, brown, shrunk. The comparison, fresh, green.

Bellis perennis, English daisy, the flower, 1:240 digitalate. In six days, flower wilted, petals drooping. The comparison flower fresh, petals at right angles.

Begonia, wax plant, flowering, height $6\frac{1}{2}$ in., daily watered with $\frac{1}{4}$ grain of digitalate in one fluid ounce of river water. In fourteen days, height $4\frac{1}{2}$ in., no new shoots, leaves and stem half the size and thickness of the comparison, top leaves dry and shriveled, flowers dead and shriveled. On the fifteenth day one fluid ounce of water daily. On the twenty-second day, two leaves remaining, four dead and dry leaves yet attached. Three feeble leaves at base, height $4\frac{1}{2}$ in. On the twenty-eighth day, height 3 in., leaves all dead, stem shriveled. The three feeble leaves of the shoot not increased in size. The comparison, flowers shed, stem thicker than the other, height 5 in. One fluid ounce of river water into the soil. After fourteen days, height 5 in., leaves twice the size of the other, fresh and waxy lustre, stem twice the thickness of the first, shoots at base with opening leaves. On the twenty-second day, height $5\frac{1}{8}$ in., six large leaves with eight more in shoots. On the twenty-eighth day, height 4 in., two leaves remaining on stem, shoots flourishing with twelve expanding leaves.

Calendula officinalis, the common marigold, the flower, digitalate 1:240. In eight days the flower is shrunk to one-half the size of the other, its yellow color deepened. The comparison flower, larger, fresher, color not changed.

Chrysanthemum indicum, Chinese variety, cultivated, bright yellow color, digitalate of sodium 1:240. In nine days very slightly wilted; color a little deepened. The comparison flower, fresher and lighter yellow.

Cichorium intubus, cichory, digitalate of sodium 1:480. In two to three days,

the flower brown, shriveled, leaf darkened. The comparison flower dried up, the leaf green.

Datura stramonium, thornapple, the leaf, digitalate 1:240. In four days the leaf is shriveled and dry. The comparison leaf, wilted but moist.

Digitalis purpurea, foxglove, grown for use in experimental medicine, the leaf, digitalate of sodium 1:240. The leaves after six hours bend and droop. In six days shriveled, dry, brittle, grey. The comparison leaves remain erect for twenty-four hours; after six days, drying and bent but not so shrunken as the other, of a fresher, greener color.

Hedera helix, European ivy, digitalate 1:500. In nine days the leaf is darker and softer, stem smaller and blackened. The comparison leaf but little changed.

Ilex opaca, American holly, digitalate 1:500. In twelve days leaves green; three of four remaining berries red, slightly shrunken. The comparison, leaves dry, two of four remaining berries dry and brown.

Ipomoea purpurea, common morning glory, digitalate 1:500. In three days the flowers, open or expanding, are shriveled. The comparison flowers, the same.

Lappa major, burdock, the leaf, digitalate 1:240. In one day drying; in four days, dry and shrunken. The comparison in one day fresh; in four days shriveling, but moist.

Ligusticum vulgare, common privet, digitalate 1:240. In five days the leaves are dry and falling. The comparison, fresh.

Magnolia grandiflora, in winter. Magnolia leaves in one fluid ounce of water, first $8\frac{1}{2}$ in. by 3 in.; second, 10 in. by $4\frac{3}{4}$ in. The leaves perfectly green and complete after seven days. First, $8\frac{1}{2}$ in. by 3 in.; second, 10 in. by $4\frac{3}{4}$ in. Color and gloss unchanged, edges a little rolled inwards.

The same, one grain digitalate to fluid ounce $6\frac{1}{2}$ in. by $2\frac{3}{4}$ in. and $6\frac{1}{2}$ in. by $2\frac{3}{4}$ in., leaves green after seven days. $6\frac{1}{2}$ in. by $2\frac{3}{4}$ in. and $6\frac{1}{2}$ in. by $2\frac{3}{4}$ in., drier, lustre fading, bleaching in patches, under surface in patches, rusty color.

The same, two grains of digitalate to the fluid ounce of water, 7 in. by $3\frac{1}{2}$ in. and 7 in. by 3 in. After seven days, 7 in. by $3\frac{1}{2}$ in. and 7 in. by 3 in. The larger leaf well preserved with three patches of fading color, the smaller leaf without lustre; color a fading green, dryer to the touch than its companion, under surface, rusty colored in patches.

Pelargonium odoratissimum, nutmeg, scented P. Geranium. Two slips of this geranium growing in a small flower-pot; one length of stem $1\frac{1}{2}$ in., four leaves. The other length of stem $1\frac{1}{2}$ in., three leaves; for eight days daily irrigation of $\frac{1}{2}$ grain of sodium digitalate in one fluid ounce of water. The height of stem of each was then 2 in.; no change in the leaves. After twenty-one days, one slip of $2\frac{1}{4}$ in. with four leaves, the other $2\frac{5}{8}$ in. with five leaves. The comparison stem 2 in., four leaves; and stem $2\frac{1}{8}$ in. with four leaves; one fluid ounce of river water daily. After twenty-one days, height $2\frac{1}{2}$ in., four leaves, one partly dead, height $2\frac{1}{2}$ in.; four leaves, two small or stunted.

Pelargonium odoratissimum (second experiment). On watering the growing plant with digitalate solution: One grain daily in water for seven days. Stem $3\frac{1}{2}$ in., four leaves; stem $3\frac{1}{2}$ in., four leaves. Seven days later: stem $3\frac{3}{4}$ in., two leaves whole, two wilted; stem $3\frac{3}{4}$ in., three leaves (one young), two wilted. Seven days later: stem 4 in., two leaves whole, two wilted, one just formed. Stem 4 in., two leaves whole, two wilted, three just formed. Comparison plant, 4 in., stem four leaves (watered daily); 5 in. stem, six leaves. Seven days later, 4 in. stem, five leaves; $5\frac{1}{2}$ in. stem, six leaves, one dead, one new. Seven days later, $4\frac{1}{2}$ in. stem, two leaves whole, two wilted, one young; 6 in. stem, three leaves whole, three wilted, four young leaves. The comparison plant is the same as the one treated with digitalate in the former experiment.

Pinus mitis, the yellow pine, a sprig of leaves; digitalate of sodium 1:240.

After fourteen days iron brown color, dry and brittle. The comparison after twenty-one days, fresh, green and elastic.

Plantago major, common plantain, the leaf, digitalate 1:240; after seven days, shriveled. The comparison after seven days, shriveled.

Rosa Damascena, the damask rose, a bud, digitalate 1:240. After five days, flower, expanding petals darkened color, limp, odor remains. The comparison fresher, color brighter.

Taraxacum dens leonis, common dandelion, digitalate 1:240. After six days the leaf shriveled and dry. The comparison after six days, shriveled and dry. The flower of dandelion in digitalate 1:240, in six days shriveled and dark. The comparison less so in size and color.

Tropaeolum majus, common nasturtium, leaf, digitalate 1:240. After one day color darkens; after three days, green yellow; after five days, yellow. Comparison after two days, yellow; after three days, bright yellow; after five days, edges rolled inward, color bright yellow, the leaf one-half the surface of the other. After nine days a gold yellow color, size one-third that of the other.

Trifolium pratense, red clover, flower and leaf, digitalate 1:240. After four days, shriveled. The comparison after four days, fresh as before.

Thus in twenty-five experiments, the poisonous action of sodium digitalate on plant life is easily demonstrated. There are in this number two instances where the acid resin seemed without harmful influence in *ilex opaca*, the American holly, and in the growing *pelargonium*, or geranium. In this plant the digitalate seemed to be a stimulus to rapid growth, as the medicated plant far outgrew its comparison. In the second experiment, however, this result was reversed. The action of the digitalate was marked and striking, but in no example more marked than in its own parent source.

A clear yellow human urine diluted with sterile water to which sodium digitalate is added, 1:240, takes on a blue tint. After three days at summer temperature the digitalate tube is very turbid from ammoniacal fermentation. A comparison tube is less turbid, the odor less offensive, and the fermentation is less active.

V. Experiments on various common insects were made to ascertain in what degree the digitalate of sodium is poisonous or destructive to them.

Experiment 1.—A croton bug (*blatta Germanica*) secured in a covered glass tumbler, sprayed with a solution of digitalate 1:1000. It is then occasionally immersed in the few drops of liquid in the bottom by gentle agitation. The insect extricates itself with feeble efforts and struggles, but soon regains its vigor. After fourteen hours regains its normal activity.

Experiment 2.—A croton bug, sprayed as the former with digitalate solution 1:480. After twelve hours active as usual. Immersed in the liquid it lies quiet for a few minutes, then crawls away.

Experiment 3.—Croton bug; a pair, 1:480 digitalate. Treated as in the preceding experiments. After fifteen hours show much activity in extricating themselves from immersion in the solution. One insect escapes, the other active and well after twenty-four and after thirty-six hours.

Experiment 4.—Cockroach (*blatta orientalis*) placed as the preceding and sprayed with a solution of the digitalate 1:480. The insect makes continuous efforts to crawl from the bottom of the glass and the thin layer of liquid, but

unsuccessfully. After twelve hours remains quiet in the solution, its occasional motions sluggish. After fifteen hours, dead.

Experiment 5.—A grasshopper (*caloptenus femur rubrum*). Treated as was the preceding. After thirty-six hours is torpid and rests perfectly quiet. Is given its liberty and remains for some time in a passive, motionless state. After an hour flies away.

Experiment 6.—The house fly (*musca domestica*). Treated as the former with a digitalate solution 1:480. The bottom of the glass is slightly wet with it. The insect struggles helplessly therein and dies within one or two hours, or succeeding finally to crawl to the side of the glass, where it remains adherent in its tracks and dies within two to four hours. The experiment is repeated many times with like results. An insect of this kind, treated with a simple water spray, shows much more strength and activity, and extricates itself much more quickly and frees itself of the adherent moisture. It may also survive twenty-four hours in such confinement.

Digitalate of sodium, then, to insects is a feeble and uncertain poison and produces no quick or uniformly fatal effects except to the house fly.

The crayfish (*astacus fluviatilis*) was selected as example of a crustacean to observe the effects of a very weak solution of the digitalate.

Experiment 7.—A crayfish, weight 100 grains, placed in a glass globe of $\frac{1}{2}$ grain of digitalate in 12 fluid ounces of river water. It moves about at bottom or rises to sides fairly active. Dead in fifteen hours. Another crayfish of same weight kept in a vessel of river water is found dead without apparent cause at the same time.

Experiment 8.—A crayfish of 120 grains, treated as the former, digitalate, one grain to twelve fluid ounces. This one is more active and stronger than the former. After fourteen to eighteen hours, moving constantly trying to get out. After forty-eight hours, seems unaffected; is restored to fresh water. These experiments prove that for the crayfish, treated as described, the digitalate of sodium is not a poison.

The minnow of the goldfish (*carassius auratus*) was used in the following:—

Experiment 9.—A minnow, a little longer than one inch, placed in a glass globe of twelve fluid ounces of river water containing one-half grain of digitalate. It swims about but not as brisk as normal, and makes no darts or dashes; inclined to remain at bottom. After four hours, the same; fourteen hours later, dead at bottom.

Experiment 10.—The same; one grain of digitalate in 12 fluid ounces. This minnow is more quiet than the former one, remains longer at bottom. After four hours, the same; in twelve hours floats dead at surface.

Experiment 11.—The same; $\frac{1}{2}$ grain of digitalate. The minnow remains quiet at bottom for twelve hours, occasionally swimming about leisurely. After twenty-one hours, condition the same. Is replaced in river water and fed. Twelve hours later, normal.

Experiment 12.—The same; $\frac{1}{6}$ grain of digitalate. After twelve hours the minnow is normal and lively; after twenty-one hours very quiet at bottom. Replaced in river water and fed; after four hours, normal.

Experiment 13.—The same; $\frac{1}{3}$ grain of digitalate. This minnow seems less active than was the preceding. After twelve hours swims about, but sluggish. After twenty-one hours is brisk and active. Replaced in river water and fed. After four hours, normal.

These experiments show that $\frac{1}{2}$ grain of the digitalate of sodium in 12 ounces of water in which a minnow is kept destroys its life in half a day. A quantity less than this is without apparent influence.

The experiments with the frog, to demonstrate the digitalis action on its heart, were preceded by the following upon the tadpole of the same. It was found that

the tadpole is even more suitable for this purpose, as regards convenience, than the developed batrachian, the only restrictions being its short existence confined to a season and the limited time of the year permitting its use.

Experiment 14.—A tadpole; hind legs appearing. Confined in a glass globe in a solution of digitalate of sodium. One-half grain in 12 fluid ounces of river water. Moves about or remains at bottom; its motions moderate. After twelve hours, more active. After eighteen hours, mild convulsions at intervals, both clonic and tonic. After forty-eight hours swims about, convulsions less frequent. Restored to river water; seems normal.

Experiment 15.—The same; one grain of digitalate. This tadpole is more active than the former, swims about at surface and splashes the solution out of the globe. After twelve to eighteen hours the splashings are more loud and violent. Clonic and tonic convulsions at short, regular intervals persisting throughout a day. After forty-eight hours quiet at bottom. Restored to river water and is stronger at end of the experiment than the former. Eight days later this tadpole was very lively; its weight 120 grains. The toxic action of digitalate upon the tadpole by immersion is very slight. The convulsions whilst severe and persistent were not apparently harmful to its life.

Experiment 16.— $\frac{1}{2}$ grain of digitalate in 5 minims of water is injected into the base of a tadpole's tail. Placed in a globe of 12 fluid ounces of water, it remains still and motionless as if dead. After three hours, it revives and swims about. After twenty-seven hours, normal.

Experiment 17.—The same with $\frac{1}{6}$ grain in 10 minims of water. Placed in a globe of water; motionless; after twenty-four hours, quiet and does not swim about.

Experiment 18.—The same with $\frac{1}{6}$ grain in 10 minims is injected obliquely into the abdomen. Dead in nine hours.

Experiment 19.—The same; dose the same into abdomen. Dead in six and a half hours.

From this it is evident that the necessary lethal dose of digitalate for a tadpole is $\frac{1}{6}$ grain, and then only when injected directly into the abdominal cavity.

In the following, the action of digitalate was not apparent, or if so, in a very transient manner.

Experiment 20.—A tadpole fixed to a board with pins; heart and abdomen exposed. Heart and intestine covered with 10 drops of a $\frac{1}{6}$ grain digitalate solution. The heart contractions were taken every fifteen minutes as follow: 54 per minute, ventricle bright red; 64 per minute; 72, strong; 60, weaker; 64; 60; 54, weak, ventricle dark red; 54, feeble and small contraction; 50.

Experiment 21.—Tadpole secured as former. One-half amount, $\frac{1}{2}$ grain in five minims of water injected into base of tail. Heart and upper half of abdomen exposed. Pulse every fifteen minutes: 60 per minute, ventricle black; 60, $\frac{1}{2}$ gr. in 5 minims dropped upon heart and intestine; 54; 50; 42; 44; 50; 52; 56.

Experiment 22.—A tadpole of 70 grains; $\frac{1}{6}$ gr. digitalate in 10 minims into abdomen at 6:30 p. m. Heart exposed at 7:30 p. m.; 7:30 p. m., 14 per minute, ventricle white; 7:35, 12; 7:40, 6; 7:45, 6; 7:50, 8; 7:55, 10; 8 p. m., stop in systole; 8:15, 52; 8:30 p. m., 56 per minute; 9:00, 56.

A tadpole for comparison of 90 grains, secured at 6:30 p. m. Heart exposed at 7:30 p. m., 56 per minute; 7:35, 56; 7:40, 56; 7:45, 54; 7:50, 56; 7:55, 56; 8:15, 52; 8:30, 56; 9 p. m., 56.

This shows the systolic heart arrest from digitalis in a classic manner. One-sixth grain of digitalate accomplished this in one and a half hours.

The succeeding records show further instances of the ventricle slowed and arrested in contraction, but also that a small dose has no effect at all in this manner, but seems even to cause a very slight quickening.

Experiment 23.—Tadpole of 100 grains, $\frac{1}{60}$ grain of digitalate of sodium in 1 minim into abdomen at 5:55 p. m.; 6:37 p. m., exposed heart, 56 per minute; 7 p. m., 56, strong; 7:12, 56, strong; 7:21, 56; 7:27, 56, strong; 7:45, 56; 8:07, 60; 8:10, 56, strong; 8:16, 64; 8:24, 62; 8:30, 60; 8:35, 62; 8:54, 64, weaker; 8:59, 60; 9 p. m., $\frac{1}{30}$ grain in solution dropped on heart; 9:05, 56; 9:10, 56; 9:20, 56; 9:30, 56, weaker; 9:35, 56; 9:45, 52; 10:07, 64, weaker; 10:15, 64; 10:30, 62.

Experiment 24.—Tadpole of 110 grains, $\frac{1}{30}$ grain in 2 minims into abdomen at 5:57 p. m.; 6:35 p. m., heart exposed. 6:35 p. m., 56 per minute; 7 p. m., 32; 7:03, 32, feeble; 7:15, 38, feeble; 7:16, 36; 7:20, 36; 7:27, 32, feeble; 7:45, 34; 8:06, 36; 8:10, 32, feeble; 8:15, 32, feeble; 8:18, 34, very feeble; 8:23, 28; 8:25, 16; 8:28, 12; 8:29, 12; 8:31, 12; 8:35, 10; 8:38, 10; 8:40, 10; 8:45, 8; 8:52, 6; 8:56, 4; 8:58, 4; 9:05, 3 in 60 seconds; 9:08, 2 in 60 seconds; 9:10, 1 in 60 seconds; 9:12, 0 in systole; 9:15, ventricle irritated, 0.

Experiment 25.—Tadpole of 100 grains. $\frac{1}{20}$ grain in 3 minims into abdomen at 7:35 p. m.; 8:10 p. m., heart exposed; found stopped in systole.

Experiment 26.—Tadpole of 105 grains. $\frac{1}{15}$ grain in 4 minims at 6:15 p. m.; heart exposed at 7:15 p. m.; 7:15 p. m., stopped in semi-systole; 7:40, now beats 12 per minute; 7:50, 6 per minute; 8 p. m., ventricle and auricles 0, arrest, pricked with forceps; 8:15, resumes beat, 10 per minute; 8:20, 0 per minute; 8:30, 0, pricked with forceps; 8:45, 8 per minute; 8:55, 8 per minute; 9:07, 0, pricked with forceps; 9:08, 8, so feeble to be seen with a lens only.

Experiment 27.—Tadpole of 130 grains; $\frac{1}{2}$ grain in 5 minims into abdomen at 7 p. m. A second tadpole of 120 grains, same injection, same dose at 7:30 p. m. Heart exposed at 8:10 p. m.

	First tadpole.	Second tadpole.
8:10	64 per minute.	64 per minute.
8:20	64	60
	60	56
	60	60
	68	52
	68	54
8:45	68	56
	64	56
	68	54
8:50	68	0 in semi-systole.
9:05 $\frac{1}{60}$ grain on heart.	68	9:15 48
Stopped ventricle in diastole.		
9:09	60 per minute.	9:30 50 very feeble.
9:17	56	
9:18 (gr. $\frac{1}{60}$)	56	
9:24 (gr. $\frac{1}{60}$)	52	
9:30	50	
9:37	0 sudden systolic stop.	

Experiment 28.—Tadpole of 110 grains, $\frac{1}{9}$ grain in 7 minims into abdomen at 6:15 p. m.; 7:15, heart exposed, stopped in semi-systole; 7:40, 4 beats per minute; 8 p. m., 6 per minute; 8:15, 0, systolic arrest; 8:30, 0, systolic arrest, pricked with forceps; 8:45, 0, systolic arrest.

Experiment 29.—Tadpole of 130 grains, with hind legs; $\frac{1}{2}$ grain digitalate in 10 minims into abdomen at 6:10 p. m.; 6:55, heart exposed, ventricle very full and strong; 6:55, 16 beats per minute; 7:22, 18, full digitalis action, apex raised up; 7:40, 20; 7:46, 20; 7:51, 18; 8:11, 19; 8:20, 16, ventricle has wave-like contraction; 8:30, 16; 8:35, 14; 8:42, 16; 8:55, 10; 9:03, 6; 9:07, 6; 9:15, 6; 9:30, 4; 9:32, 3; 9:33, 3; 9:35, 1; 9:37, 0, systole; 9:40, 0 when pricked.

Experiment 30.—A double:—

Tadpole of 70 grains, $\frac{1}{15}$ grain in 5 minims into abdomen at 6:07 p. m.		Tadpole of 65 grains, $\frac{1}{15}$ grain in 4 minims into abdomen at 6:08 p. m.	
6:48 p. m.,	exposed heart.	6:45 p. m.,	exposed heart.
6:48 ..	heart stopped.	6:48 ..	heart stopped.
6:49	44 beats per minute, weak.	6:46	36 beats per minute, strong.
6:52	semi-systole.	6:52	32 beats per minute.
6:54	40, stronger; both now digitalis hearts.		
6:58	42 beats per minute.	6:57	31 per minute.
7:07	42 beats per minute.	7:05	32 per minute.
7:17	40 beats per minute.	7:13	32 per minute.
7:21	44 beats per minute.	7:19	36, weaker.
7:26	46 beats per minute.	7:25	40
7:35	48 beats per minute.	7:33	44
7:41	48 beats per minute.	7:44	44, auricles dicrotic.
7:59	48 beats per minute.	7:57	44, auricles dicrotic.
8:06	50 (stronger than other)	8:07	44
8:30	44	8:33	44
8:39	50	8:33	44, failing.
8:49	48	8:38	44, dicrotic.
9:10	48, faint.	8:47	32, dicrotic; lens needed to count beats.
9:13	0, slight convulsion.		
9:22	52	8:54	48, dicrotic.
9:45	44	9:09	44, not dicrotic; very faint.
10:17	48	9:15	0, stop.
10:18	too faint to count.	9:23	48
10:25	48	9:46	40, not dicrotic.
10:35	44	10:15	0, convulsions.
10:45	48	10:19	0, stop in systole.
10:50	44		still contracts when pricked.
11:00	0, systole.		

Experiment 31.—The frog (*rana virescens*). Weight 14 dr.; 6:30 p. m., pithed and injected into right thigh $\frac{1}{2}$ grain digitalate of sodium in 30 minims; 7:10, heart exposed; 7:11, 60 per minute; 7:14, 56; 7:30, 52; 8:05, 48, very strong; 8:20, 48; 8:34, 48; 8:44, 44; 8:56, 40; 9:05, 40; 9:17, 42; 9:30, 42; 9:43, 46; 9:55, 46; 10:06, 42; 10:18, 48; 10:27, 48, wet compress on heart; 8:05 a. m., 28, dicrotic; 9:14, 28; 10:15, 24, very dicrotic; 1:20 p. m., 24; 2:17, 28; 3:13, 32; 5:00, 24; 7:15, 20, ventricle faint, auricles stronger; 8:00, 20; 9:12, 16; 9:25, 0, ventricle in systole; 9:27, 12, auricles only; 9:45, 8; 10:00, 0.

Experiment 32.—The frog (*rana virescens*). Weight 9 dr.; $\frac{1}{3}$ grain in 20 minims into right thigh at 6:22 p. m.; 7:04 p. m., heart exposed, strong white ventricle contractions; 7:05, 40 beats per minute, apex points upward in systole; 7:32, 48; 7:57, 40, digitalis heart; 8:10, 44; 8:21, 36; 8:35, 40; 8:45, 36; 9:06, 36; 9:31, 36, ventricle action very strong; 9:44, 40; 9:56, 44; 10:07, 40, ventricle contracting, snow white; 10:17, 44; 10:28, 40, wet compress on heart; 8:06 a. m., 44; 9:15, 44, strong acting ventricle; 10:16, 48; 1:19 p. m., 40; 2:16, 40; 3:14, 44; 5:00, 40; 7:16, 44, very strong, frog pithed; 8:00, 0, stop systole, ventricle pricked; 8:20, feeble contractions in ventricle.

Experiment 33.—The same, 8 dr., pithed at 6:25 p. m.; $\frac{1}{6}$ grain in 10 minims into right thigh; 7:15 p. m., heart exposed, systole ventricle white; 7:20 p. m., 52 beats per minute; 7:31, 48; 7:50, 52; 8:20, 52; 8:36 to 10:08, 48; 10:16, 46; 10:30, 48, wet compress; 8:07 a. m., 24; 9:15, 24; 10:17, 20; 1:21 p. m., 0 systole, ventricle pricked; 2:15, 20, the auricles contract, the ventricle partly; 3:12, 20, auricles contracting and left half of ventricle; 5:00, too faint to count; 6:00, 0.

Experiment 34.—The same, 7 dr.; pithed at 6:30 p. m. for comparison; 7:00

p. m., exposed heart dicrotic, ventricle purple; 7:00 p. m., 48 beats per minute, contractions weak, unlike digitalis heart; 7:32, 44, weak; 7:45, 44; 8:04, 40, dicrotic; 8:18, 40; 8:30, 36, ventricle empty, arrest, pricked, turns white; 8:42, 28, weak; 8:55, 30, dicrotic auricle, ventricle still; 9:03, 32, dicrotic auricle; 9:15, 32; 9:42, 32; 9:53, 28, faint; 10:05, 20; 10:15, 16, very faint; 10:25, 0.

Experiment 35.—A double:—

The frog (*Rana virescens*), 10 dr.; pithed 6:30 p. m., 1 grain in 60 minims into abdomen; 7:40 p. m., heart exposed.

7:50 p. m., 40 beats per minute, weak.
8:06 24 beats per minute, dicrotic.
8:13 20 beats per minute.
8:18 20 beats per minute.
8:29 16 beats per minute, feeble.
8:40 0 beats per minute, ventricle spasm, very white.
8:45 18 beats per minute, auricles only.
8:55 16 beats per minute.
9:15 16 beats per minute.
9:17 0, ventricle systole.
9:17 irritate ventricle.
9:20 auricles only contract.
9:23 0.

The same, 7 dr., pithed 6:21 p. m. The comparison. 7:36 p. m., heart exposed.

7:41 p. m., 52 beats per minute.
8:11 40 beats per minute, weak.
8:21 40 beats per minute.
8:27 44 beats per minute.
8:44 44 beats per minute.
8:57 40 beats per minute.

9:46 44 beats per minute.
10:01 40 beats per minute.

7:30 a. m., 36 beats per minute, feeble.

Experiment 36.—The same, 8 dr.; pithed at 6:30 p. m.; 6:55 p. m., 60 minims. 1 grain, into both thighs; 7:50 p. m., heart exposed, ventricle small and white; 7:55, 40 beats per minute; 8:08, 28, very strong, ventricle action; 8:14, 32; 8:30, 32, ventricle changes in contractions; 8:56, 32, from deep purple to snow white; 9:03 to 9:30, 28; 9:45 to 10:02, 32; 10:07, 28; 7:30 a. m., 0 in systole.

Experiment 37.—A double:—

The same, 9 dr., pithed at 6:09 p. m.; at 6:13, 60 minims, 1 grain, into abdomen. Heart exposed at 6:55, small white ventricle.

6:57 p. m., 36 beats per minute.
7:34 36, dicrotic.
7:48 34, very strong.
8:00-8:15 32
8:34-8:47 34
9:03 36
9:15 32
9:26-9:50 36
9:58-10:15 40, apex white in systole; base, black.
8:14 a. m., 12, auricles only.
0, ventricle in systole; apex white, base black.
9:05 a. m., 12, auricles.
10:00 6, auricles.
10:15 0

The same, 9 dr., pithed at 6:10 p. m.; at 6:15, 30 minims, $\frac{1}{2}$ grain into abdomen. Some hemorrhage in exposing heart. Heart exposed at 7:00 p. m.

7:00 p. m., 44 beats per minute.
7:30 44
7:33 48
7:48 48
7:59 44
8:16 44
8:35 44
8:46 44
9:02 44, weaker.
9:13 44
9:24 44
9:48 48, weaker.

9:54 48, auricles only.
0
0, ventricle in systole.
10:00 52, auricles.
10:27 52, very faint.
8:15 32, very faint.
9:04 8
10:01 8
10:15 0

Experiment 38.—A triple:—

The same, 12 dr.; 6:30 p. m., 2 grains into abdomen, 30 minims water; 7:40 p. m., heart exposed; sluggish.		8 dr.; at 6:30 p. m., $1\frac{1}{2}$ grains into abdomen, 20 minims water; 7:50 p. m., heart exposed; active.		7 dr.; at 6:30 p. m., $\frac{3}{4}$ grain into abdomen, 10 minims water; 7:55 p. m., heart exposed; active.	
7:40 p. m., 56 per minute, strong.		7:50 p. m., 60 per minute.		7:55 p. m., 56 per minute.	
8:07	60	8:06	54	8:03	52
8:22	40	8:23	52, weak.	8:25	48
8:31	36	8:30	0 systole,	8:35	48
			pricked.		
8:40	40, digitalis action.	8:37	ventricle contracted a few times.	8:39	48, digitalis action.
			auricles act faintly.		
8:47	36	8:38		8:50	48
9:03	44	8:39-8:45	44	9:02-9:21	44
9:07	40, dicrotic.		seen with a lens.	9:28	48
9:15	36			9:46	50
9:20	40	9:15	0 systole.	10:00	52
9:27	44			10:10	48
9:45	48			10:23	52
10:01	52			8:14 a. m.,	48
10:11	52			8:45	44
10:22	60			6:15 p. m., 36,	strong digitalis action.
8:15 a. m.,	52				
9:45	44, pithed; heart 0 systole.				

In these experiments on tadpoles and frogs it was found that the former give more accurate results than the latter, and in shorter time; that when the injection is into the tail or thigh, the latter the one usually practised, the dose effective is large and the action slow; and that intra-abdominal injection is best, allowing one-half hour or longer for absorption before the heart is exposed. When one-sixth of a grain of digitalate in solution in water is dropped upon the exposed heart and intestine of a tadpole, there is a transient increase in the number of heart beats; $1/12$ grain slightly reduces the number (Experiments 20-21); $1/6$ grain into abdomen systolic heart arrest in one and one-half hours; $1/9$ or $1/15$ grain in two hours; $1/30$ grain in three hours (Experiments 22, 24, 26, 28). The heart stop may be sudden and not preceded with the actual reduction in the number of beats: Experiment 27 in two and one-half hours from $1/12$ grain, and Experiment 29 in three and one-half hours from $1/5$ grain.

With the frog, when $1/2$ grain is injected into the thigh, the ventricle stops in twenty-six hours (Experiment 31); from $1/3$ grain the heart still acts with 44 beats per minute after fourteen hours (Experiment 32); from $1/6$ grain the heart stops in nineteen hours (Experiment 33); 1 grain, intra-abdominally, caused heart arrest in two hours; $1/2$ grain in three hours and a half (Experiments 35 and 37). In another frog, 1 grain, intra-abdominally, caused heart arrest after five or six hours, the digitalis action on the ventricle being most accurately displayed before that time.

In Experiment 38, 2 grains of digitalate in a frog, 12 dr., did not stop the heart in fifteen hours or $3/4$ grain in a frog, 7 dr., in twenty-four hours, whilst $1\frac{1}{2}$ grains in a frog, 8 dr., was fatal in less than three hours.

It seems plain from these records of the heart action of the digitalate in the frog that a medium large dose is more efficacious in causing heart arrest in a short time than a large dose, and that the larger dose does not produce the peculiar spasm of the ventricle in which it is fixed in systolic arrest. Somewhat analogous to this is the effect of a stronger and weaker solution of the digitalate in causing the dying stage in the leaf of *magnolia grandiflora*.

VI. To determine the effects of very large doses of digitalate of sodium upon small mammals, the following experiments were executed:—

1. A young cat, six months old, in good health, was given $2\frac{1}{2}$ grains of the green digitalate by injection under the skin of the back. The solution in 30 minims of water. Transient pain at side, becomes very quiet, seeks a dark corner, refuses food and drink. The next day has revived. Takes food and continues in her ordinary state.

2. A cat of nine or ten months; pregnant; 4 grains of the green digitalate in 30 minims of water as in the preceding. Quiet in a dark corner, refuses food. After twenty-four hours, normal.

3. A cat of nine months; 5 grains of the fawn-colored digitalate as in the preceding. Injection less painful than in first and second. The cat remains quiet just like the others and is herself again in a day. Five days later, site of injection is an open, clean slough of the skin, $\frac{1}{2}$ in. in diameter, base healthy.

4. A full-grown rabbit treated as was the third; 5 grains fawn-colored digitalate. No effect at all, probably quiet for a day or two, but perhaps from fear. Site of injection not changed. After two weeks a small sloughing of the skin, no supuration.

5. A guinea-pig, 3 grains of green digitalate in 30 minims of water between the shoulders. Becomes quiet and torpid, nibbles at food. Dead in fourteen hours. Marked rigor mortis. The injected surface under the skin has the cellular tissue stained with the green salt. The lungs are pale, auricles black with blood; the right ventricle full and purple. The left ventricle flesh white, very small and contracted.

6. The same as 5, but 2 grains of green digitalate; quiet, refuses food; death in fifteen hours; heart and lung as in 5. Site of injection less colored but some ecchymoses.

7. Guinea-pig, 4 grains of fawn-colored digitalate as in the others. It is more active than 5 or 6 and nibbles at food; soon becomes quiet and starts only when approached. Death in thirteen hours. Lungs as in 5 and 6, heart ventricles and auricles the same.

Two grains of digitalate are fatal in half a day to the guinea-pig, the heart found in the state about to be described. Four and five grains are without any effect upon the rabbit except transient torpidity. In the cat, seclusion, darkness and refusal of food or drink is the state of the animal for a day, followed by prompt recovery. The gravid uterus in the cat continues its function.

8. Young guinea-pig, weight 11 oz.; 1 grain of green digitalate, no effect after forty-three hours; 2 grains of green digitalate, no effect after twenty-five hours; 3 grains of green digitalate, tonic and clonic convulsions several hours before death, twenty-two hours after last hypodermic injection. Much rigor mortis

very soon after death. Sites of injections and cellular tissue stained green. No inflammation. Lungs flesh red, heart auricles full of blood; right ventricle the same, and overlying the left ventricle bloodless and small. Hardened in alcohol for a day, transverse section of the heart ventricles gave these measurements:—

Transverse breadth, 11 millimetres.

Right ventricle, internal wall, 1 millimetre.

Left ventricle, diameter, 7 millimetres.

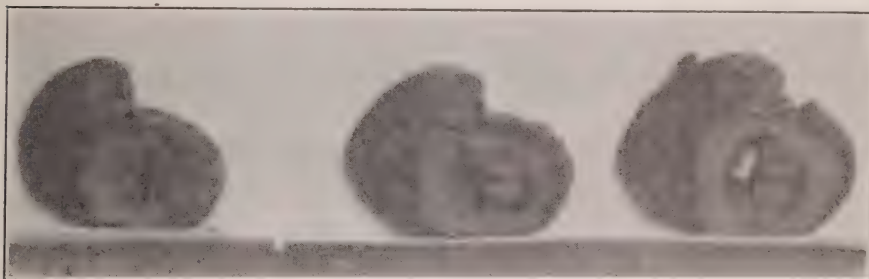
Left ventricle, external wall, 3 millimetres.

Cavity, right ventricle, 3 millimetres.

Cavity, left ventricle, 2 millimetres.

The right ventricle full of blood; the left ventricle, empty, contracted and uniformly white.

9. Young guinea-pig, 10½ oz.; 2 grains of fawn-colored digitalate. After twenty-four hours, no obvious effect; 3 grains of fawn-colored digitalate, bites at site of injection; after twenty-four hours sits huddled and torpid; tonic and clonic convulsions several hours before end, fifty-seven hours after last injection.



Transverse sections, guinea-pig's heart ventricles. Killed with digitalate of sodium. Experiment 9. Alcohol hardened. Photograph enlarged seven-fold.

Weight of dead body, 9½ oz. Site of injection not stained; some ecchymoses over dorsal muscle, clear bloody serum subcutaneous behind shoulders and over ribs. Lung very small and pink color. Heart: auricles full of blood, likewise the right ventricle; left ventricle pale, small and covered by the right. Hardened in alcohol, transverse section of ventricles gave these measurements:—

Transverse breadth, 11 millimetres.

Right ventricle, 4.5 millimetres.

Right ventricle cavity, 4 millimetres.

Left ventricle, 7 millimetres.

Left ventricle cavity, 3 millimetres.

Thickness right ventricle wall, 0.5 millimetre.

Thickness left ventricle wall, 3 millimetres.

Left ventricle and its cavity, bloodless.

The large quantity of the digitalate needed to destroy life in Experiments 8 and 9 may have been due to the greater vigor of the animals, but probably the preparation used had somewhat deteriorated from keeping and much exposure. The illustration shows correctly the state of the ventricles. The hearts of all the guinea-pigs killed with large doses of digitalate appeared in the same state. Auricles full of blood; right ven-

tricle the same and overlying the left ventricle, small, white, contracted and empty. In the guinea-pig (mammal heart) the left ventricle is stopped and fixed in a spasm which does not relax after the animal's death and has the identical appearance of the single heart ventricle of the frog killed with the same poison. Hence the invariable systolic ventricle arrest in the frog by digitalis, and the left ventricle systolic arrest of the guinea-pig is the same effect from the same drug. The right ventricle, full of blood and in marked diastole, shows that digitalis acts primarily and mainly upon the heart muscle itself; it cannot affect the right ventricle at all, but throws the powerful muscle of the left ventricle into a contracture that is permanent.

The declaration so often made that the heart in mammals is generally found in a condition of diastole in cases of fatal digitalis poisoning (Cushny) is therefore incorrect when applied to that of the guinea-pig and the poisonous action of digitalic acid. Perhaps from the digitalin, digitoxin or digitalein of the plant, or from the preparation used, the heart of the warm-blooded animal may stop as it does in relaxation in death from a multitude of causes. The systolic ventricle arrest observed from the acid resin shows in all instances this active principle to have fixed and identical properties, and is therefore free from secondary or extraneous effects.

VII. As heart defects are perhaps the commonest of all morbid lesions, as the heart mechanism is impaired in many acute and chronic diseases, as its primary alterations of inflammation and degeneration give numerous symptoms, direct, sympathetic and reflected, and their primary cause is often overlooked because not sought for, it follows that the remedy or remedies for relief or cure must be in daily use, and without their proper and correct administration internal medicine would be in a most lamentable condition of helplessness. Hence, the practitioner without the necessary knowledge and skill is in a helpless or harmful position from not knowing how to make use of the drugs beneficent in combating the distressing and painful symptoms inherent to the lesions of cardiac derangement and weakness. It is further evident that a scarcity or lack of patients is never wanting to the physician, but can always be encountered in private practice or hospital wards.

The diseases of the heart should be the specialty of every doctor of medicine on account of the great number of causes producing them and the endless frequency of their occurrence.

The cases arranged represent types of almost all the diseases in which digitalis has been found so necessary and indispensable. They are not sporadic or selected but were actually encountered in succession in practical medical work in a period of two years. Some were acute and transient, others were treated systematically as the disease continued for many months.

The repeated praise bestowed upon digitalic acid and the frequency

with which its great superiority over digitalis itself is contrasted may appear too warmly drawn, yet aside from the enthusiasm incident to observing the smooth accuracy of its action, part of the praises were the expressions and opinions of the subjects treated.

The acid resin and the sodium digitalate have now been used by the writer for some years to the exclusion of digitalis and its several preparations of the shops. The primary advantage of the use of digitalic acid is that it does not produce gastro-enteric irritation and that it can be immediately substituted for digitalis when this has caused so much irritation as to make its further use for the time impossible.

Patients approve the action of this new form of the drug from the certainty of effects, and also from the accuracy and convenience of giving the remedy in a single daily dose.

A summary of the cases of daily practice successfully treated represents all the diseases in which digitalis is so useful, others in which its utility is disputed, and some of new or forgotten value: melancholia, delirium tremens, chronic alcoholism, alcoholic mania, heat exhaustion, chronic headache of fatigue, trifacial neuralgia from heart diseases or heart weakness, congenital small heart and arteries, chronic myocarditis, fatty heart and fatty degeneration of the heart, the stenoses and regurgitations of the aortic and mitral valves with dilatation or degeneration of the ventricles, the dilated heart of chronic bronchitis, spasmodic asthma, liver cirrhosis and subacute and chronic nephritis, obesity and idiopathic heart hypertrophy and dilatation, puerperal eclampsia with heart defect, pneumonia, collapse of high fever, sepsis, heart dilatation from masturbation and weakness from nightly pollutions, tobacco heart and digitalis intolerance, heart degeneration of arthritis deformans, arteriosclerosis with a weakening heart, spinal tabes of old men with atheroma of the aorta and defects of the aortic valves, adhesive pericarditis, chronic urticaria, status lymphaticus, paroxysmal tachycardia, angina pectoris, cardiac asthma, asthma humidum, and acute pulmonary edema due to organic lesions of the heart.

VIII. The administration of digitalis must be guided and governed by certain principles and purposes for the object to be attained, which, if not clearly held in view, will result in ill success. When to give the drug, how often and how long, how large or how small the dose should be must be accurately decided. That the drug is not inert, that its action is not poisonous, must also be promptly detected. The purpose is to strengthen the contractions of the heart ventricles or support them when weakening, be it in the future from some present disease, a weakness already present, or a compensation about to totter or already damaged.

The compensation of heart action, as long as it is steadily supported, carries the patient along in a state resembling health. Preventing the catastrophe of heart failure is always more efficient than a rescue from imminent danger.

The digitalis that does this is the ideal remedy, a power prompt and persistent, and which does not fail as long as the heart muscle thus supported can perform its function.

The opinion that the digitalis leaf, all in all, is the most certain and reliable part of the drug indicates also that the best and simplest of its pharmaceutical preparations is the powdered leaf itself. The powdered leaf is active in strengthening the systolic contraction of the heart ventricles, raising the blood-pressure and regulating the normal urinary secretion. Digitalis leaf in appropriate dose accomplishes this with such promptness as to make it the greatest of all the remedies of treatment, but harmful effects do occur and render its use uncertain in some cases and imperfect in others. Finally, there may be no effect or result at all. The leaf may have lost most of its virtue by long keeping. The plant, as gathered, may first of all have contained too little of the active principle as observed when cultivated. The patient may be intolerant even of small and incipient doses. The dose may have been too large or too frequently repeated. Nausea, vomiting and diarrhea may begin suddenly after a small or large dose. Finally the cumulative action is seen as a fact, although by some theoretically denied. Thus the physician is checked and defeated in the act and the aid of digitalis is lost for a time or forever. To use the drug in the perfunctory manner in doses repeated every few hours or three times a day will be followed by intolerance, either speedily or later on. A far better method of giving it is to combine the quantity estimated as needful for twenty-four hours into a single dose of one, two or three grains to be taken in the morning after breakfast. The heart ventricles respond in a day, never later than the third day in a case properly selected and the quantity of the drug necessary correctly estimated. The larger dose is always more suitable to the male subject.

When the given amount produces the desired effect, the repetition of it must be adjusted to the subject's need and capacity. It is repeated in one, two or three days. As accuracy in the dose adjustment of digitalis is very necessary, it may be observed in this connection that the authoritative statement in the Eighth Revision of the U. S. Pharmacopeia to the effect that the average dose of digitalis is one grain is incorrect and harmful. For one grain thrice daily is more than most patients can endure longer than a week. One grain but once a day is too little. The plan just described is the only practical way of using digitalis with success.

In dropsy, cardiac asthma, lessened urine, where the patient needs immediate and continuous aid, the single daily dose is proper until compensation is adjusted and venous stasis removed. Then the more infrequent intervals of giving the remedy are kept for an indefinite time.

Digitalis therapy has always been abused by giving doses, large and often, and discontinuing the remedy far too soon. The so-called cure of dropsy is often regarded as a brilliant result, but this is followed by a return or the patient's death.

In the gravest and most urgent cases, giving the medicine by the stomach, using it as a poultice, bath or enema, are all inadequate as a means of rescue, and not the remedy but the mode or medium of its use is inefficient.

There is no sure or safe passage for aid open but the hypodermic injection method, and this can only avail where the active principle of the drug is absorbed without the reaction of local irritation or inflammation. The hypodermic injection of digitalis has so far not been successfully practised from the fact that no Galenical preparation or glucoside of the plant has been found safe, sure or useful for this purpose.

The infusion is the second form of digitalis held by many in equal or greater esteem than the powder. The infusion was the preparation first of all used by Withering, the powder later on receiving his commendation. The infusion contains all the active constituents in solution, resin and glucosides. It is, of course, not permanent like the tincture or fluid or solid extract. As all these hold all the active constituents, there can be no difference in virtue or strength, except what is found in them when kept too long or such as is found in their original source, the dried leaf. This varies considerably with the country, soil, wild growing or cultivated, age and season. All digitalis is active, one much more active than the other, and hence varying only in the quantity of the proper dose. As this is small and compact, it is evident that the powder of the well-dried leaf is the best form for directness of administration, convenience and simplicity.

That water, alcohol, ether or other solvent of the drug, or that conservation of the fresh juice of the green plant can enhance or improve the quality of digitalis is impossible; rather it may deteriorate by faulty preparation or from the changes of exposure, light, dampness and long keeping.

As nothing is easier than the swallowing of a grain or two of powder, pill or capsule, the pharmaceutical art cannot improve the action of so simple a remedy.

Digitalis is readily absorbed by the system. Perhaps a test of the quality of the drug is to be found in the bitterness of taste of a good leaf, and the patient can enhance the speed of its absorption by masticating the dose before it is swallowed. The powder of the leaf then can be held to be the best mode of giving it, as it is the quickest and most convenient.

The detrimental effects and disadvantages of the use of digitalis are its poisonous action in too large a dose, single or repeated; its poisonous power from small doses in the susceptible; that some cannot tolerate it in any amount; that the Galenical preparations or its glucosides are not useful in the hypodermic way.

With digitalic acid, the crude acid resin, and with digitalate of sodium, the single, pure action of digitalis upon the heart is obtained without any secondary deleterious effects. Digitalic acid, the crude resin, or the digi-

talate of sodium is given in a single daily dose of 1/33 grain; in urgent need the dose is repeated a second time the same day until the severity of the symptoms is mitigated. Headache, nausea, vomiting, diarrhea or the collapse of cumulative action is never encountered and the remedy can be safely ingested every day for many weeks.

The clinical use of the resin shows that, as all the good effects of digitalis result from its use and none of the toxic effects, the poisonous properties must reside in digitalin alias digitoxin, and that as this principle powerfully influences the heart, its properties are identical with the whole of the leaf, medicinal and toxic.

When digitalate of sodium is injected under the skin in a medicinal amount in a subject of normal cutaneous sensibility a sharp, smarting pain is set up, lasting a few minutes. Those who have felt the sensation of a bee sting declare the digitalate pain to be very similar. The next day the spot of the needle puncture is a red point with a halo. Some soreness is produced by passing the finger over the area. There is no induration remaining; no pustule, phlegmon or abscess is produced.

In using the hypodermic injection upon those gravely or acutely sick, as in the subject of sudden heart failure or collapse, in cardiac asthma or humid asthma, in grave fevers, in the hysterical or insane, the pain of the injection is never complained of at that time, and, in fact, in practice a crude test of improvement in the stage of disease can be perceived by the vividness of complaint of the pain inflicted.

A solicitous husband said of his sick wife that she immediately grew well when the injections were stopped.

To conclude, the acid resin, digitalic acid, has all the virtues without any of the poisonous properties of digitalis in medicinal or larger doses; it does not produce gastro-intestinal or subcutaneous irritation; and its poisonous powers do not accumulate, however long it may be given. Further, that a single daily dose of the resin is sufficient in all ordinary cases, but rarely need it be repeated in the same day, and then only for a short time; that where sure absorption and accurate and profound effect are imperative the digitalate of sodium is used daily as a single injection of 1/32 grain so long as the necessity of its use obtains; and, finally, that this likewise may be continued for a long time without any immediate or ultimate danger of poisoning.

THE HIGH, SHORT INCISION FOR CESAREAN SECTION.*

By H. S. CROSSEN, M. D., of St. Louis.

When delivery by cesarean section is required, its execution through a short, high incision, placed entirely above the umbilicus, possesses distinct advantages.

There are three principal incisions for delivery of the child by regular cesarean section, and the technique of the operation varies considerably with the incision employed. The incision first used was long, and through this the unopened uterus was turned out onto the abdominal surface (Fig. 1B). Then the uterus was incised, the child delivered, the membranes removed and the uterus sutured and dropped back. Later came into use the medium-length incision, placed approximately half above and half below the umbilicus and slightly to the left (Fig. 2A). Through this the uterus was incised, the child delivered, and then the collapsed uterus was brought out upon the abdominal surface (Fig. 2B), where the membranes were removed and the uterus sutured. Still later came into use the short incision placed wholly above the umbilicus (Fig. 3). Through this the uterus is incised, the child delivered, and the uterus emptied and sutured. The uterus is not turned out upon the abdominal surface at any time. This high incision was described by Dr. Asa B. Davis, of the Lying-in Hospital of New York, and used by him in a large series of cases. It proved very satisfactory—so satisfactory that it is now used as the routine incision in all suitable cases in that very large institution.

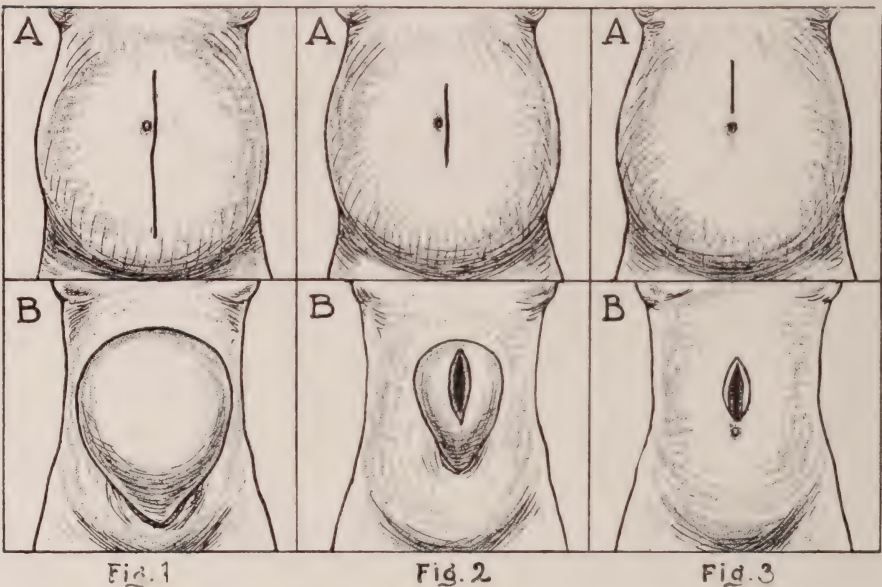
In the following case I employed the high, short incision with much satisfaction. Abdominal delivery was required in this case on account of extensive scar-tissue in a moderately contracted pelvis. The patient, Mrs. S., referred to me by Dr. H. R. Hall, was twenty-four years of age, height 5 ft. 3 in., weight 120 lb., rather slender, fairly muscular and of good general build. She lived in Canada, and was there delivered of her first child in October, 1910. It was a long, severe labor and was terminated by high forceps operation. This proved an exceedingly serious matter, and resulted in the death of the child during delivery and extensive laceration of the lower uterine segment and adjacent tissues. The child was a male and weighed 8 lb. The patient was informed that the trouble was due to a small pelvis. She was in the hospital for three weeks and afterwards recuperated very slowly.

The patient became pregnant again in 1912, and in August came to St.

*Read before the Medical Association of the Southwest, at Kansas City, October 7th, 1913.

Louis to consult me as to how to secure a live child. She was then six and one-half months pregnant. The pelvic measurements showed the pelvis flattened to a moderate extent and slightly funnel-shaped, but none of the diameters was reduced sufficiently to preclude the birth of a head of normal size and consistency. There was another factor, however, which had to be considered, and that was extensive scar-tissue which radiated from the cervix and involved the surrounding structures—in some places out to the pelvic wall. This extensive scar-tissue in a pelvis already moderately contracted constituted a most serious obstacle to safe delivery per vaginam.

After careful study of the conditions I concluded that there was very



THE THREE INCISIONS FOR CESAREAN SECTION.

Fig. 1.—The long incision, first employed, through which the unopened uterus is turned out.

Fig. 2.—The medium length incision, half above and half below the umbilicus, through which the incised and emptied uterus is turned out.

Fig. 3.—The high, short incision, placed entirely above the umbilicus. The uterus is kept wholly within the abdomen all the time.

poor chance of securing a living child by vaginal delivery, and the attempt was likely to result in serious tearing of important pelvic structures held immovable in the mass of scar-tissue. That is, vaginal delivery presented only a slight probability of an uninjured child and great probability of serious injuries to the deep pelvic structures of the mother—injuries which would be more serious than the wounds of abdominal delivery, both from the standpoint of immediate danger and of ultimate disability. Furthermore, I felt that under the conditions pres-

Fig. 4.

Fig. 5.

Fig. 6.

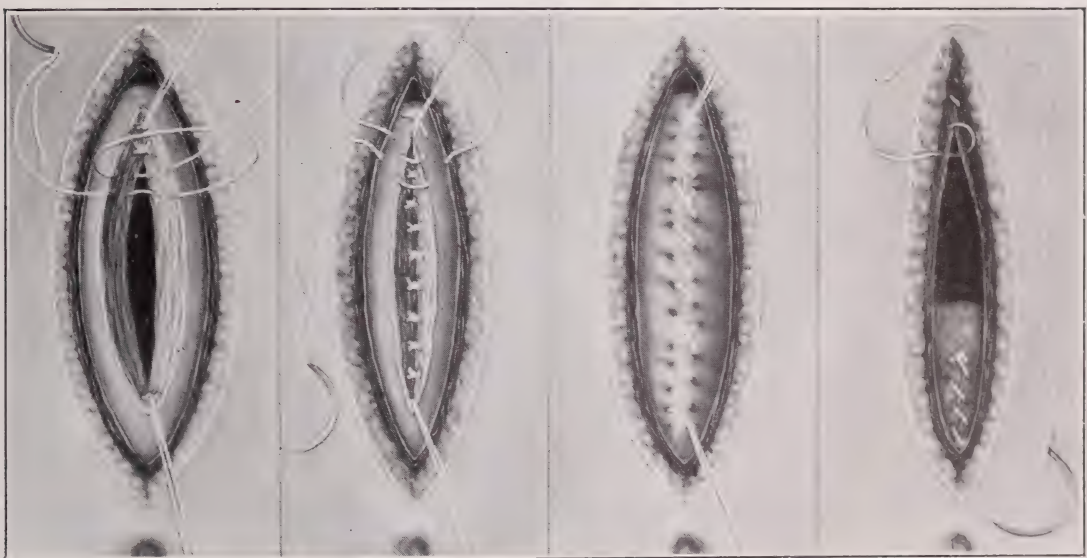
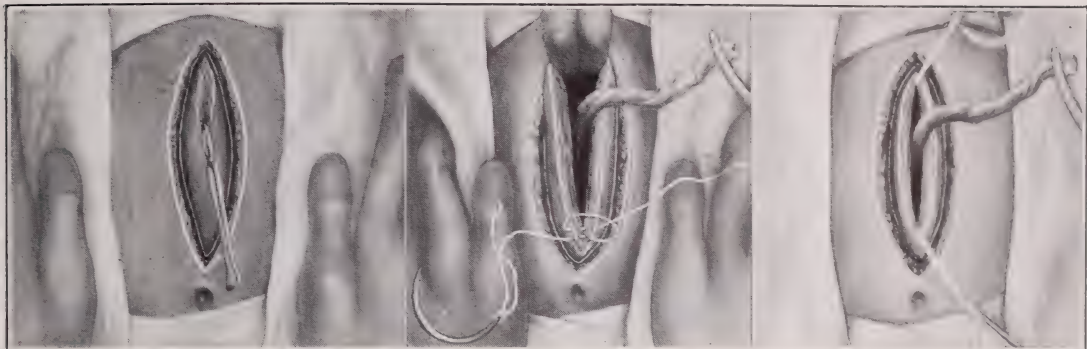


Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

TECHNIQUE OF CESAREAN SECTION THROUGH THE HIGH INCISION.

Fig. 4.—The abdominal incision made, and beginning the uterine incision. The assistant by firm pressure holds the uterus against the abdominal wall and also controls the bleeding to some extent.

Fig. 5.—Fingers hooked in upper angle of wound to control bleeding by tension. Lower traction suture in place.

Fig. 6.—Method of controlling uterus by the two traction sutures during the delivery of the placenta and subsequent manipulations.

Fig. 7.—Placing the deep muscular sutures for closing the wound.

Fig. 8.—Placing the second row of sutures, which turns in the raw edge and makes accurate approximation of the peritoneal surfaces.

Fig. 9.—The wound closed, and ready to cut short the two traction sutures.

Fig. 10.—The sutured uterus dropping out of sight. The suturing of the abdominal wound begun.

ent, the greater relative danger, to the mother and to the child, of vaginal over abdominal delivery held true even though vaginal delivery were aided by premature delivery, vaginal cesarean section, pubiotomy, or by any combination of these measures. Hence I advised delivery at term by cesarean section, and later carried out the same, using the high, short incision. The mother and child recovered without special incident and went home in excellent condition.

The technique of the operation is as follows:—

- (1) A full dose of some reliable hypodermic preparation of ergot is



Fig. 11.—Photograph of a patient seventeen days after operation, to show the sinking of the uterus entirely away from the abdominal wound. The entire lower abdomen is resonant to the pubic bone, showing that the uterus is not adherent to the wall. By deep palpation the fundus uteri may be felt in the pelvis as indicated by the dotted line.

administered shortly before the anesthetic is begun, so that it will take effect at the time of delivery. Ordinarily, about thirty minutes is required for it to take effect. Pituitary extract acts much more quickly (in from five to ten minutes), though not so certainly.

- (2) A four-inch or five-inch incision is made entirely above the umbilicus, as shown in Fig. 4. A gauze sponge wrung out of hot normal saline solution is then pushed in above the fundus uteri, to catch fluid

that may escape and to prevent the escape of the intestine as the uterus collapses on extraction of the child. An assistant then grasps the abdominal wall well out on each side (Fig. 4), and straightens the uterus (so it may be incised in the median line) and presses it firmly against the abdominal opening so as to prevent, as far as possible, fluid escaping into the abdominal cavity.

(3) The uterus is opened rapidly (Fig. 4), the membranes separated from the anterior half of the uterus by a sweeping movement of the hand, the membranes penetrated, a leg grasped and the child extracted. The bleeding is controlled to some extent by the assistant who is making firm pressure over the sides of the uterus. In cesarean section, by any method, there is necessarily considerable loss of blood when the uterine sinuses are open; hence this stage of the operation should be completed quickly and the uterine incision pulled tense, by hooking two fingers in the upper angle and making traction as indicated in Fig. 5. The separation of the unopened membranes from the front part of the uterus, by a sweeping movement of the hand, is accomplished with very little loss of time and facilitates their subsequent removal. Of course, if the placenta is under the incision, the hand is plunged directly through it.

(4) While the uterine incision is pulled up, as above mentioned, a strong catgut suture is placed at the lower angle (Fig. 5). This is then used as a traction suture to hold the uterus while a similar suture is placed at the upper angle of the wound. Both these sutures are left long (Fig. 6), to be used as tractors for holding the uterus during the delivery of the placenta and the subsequent suturing. The traction sutures are placed in the same manner as the muscular sutures that close the deeper layers of the wound.

The pressure by the assistant's hands at the sides of the uterus is maintained, the hands following the collapsed uterus as the child is extracted, and grasping and firmly compressing the sides of the uterus through the abdominal wall during the extraction of the membranes and the subsequent suturing.

(5) After the traction sutures have been placed, the placenta and membranes are extracted. While the hand is in the uterine cavity, during extraction of the membranes, the internal os is felt to see if it is open enough for drainage. If not dilated sufficiently to admit one or two fingers, it is well to dilate it some with the fingers.

If the uterus does not contract well when the membranes are removed, it should be stimulated by manipulation, and if this is not sufficient, then by a hot towel packed into the cavity.

(6) The uterine wound is closed by two rows of interrupted sutures, each of chromic catgut (20 day No. 1 or 2). The first, or buried sutures, are interrupted and include the greater part of the thickness of the muscular wall, but miss the peritoneum and the endometrium (Figs. 7

and 8). Then the peritoneal portion of the wound is turned in and covered by a continuous suture (Figs. 8 and 9).

(7) After the closure of the uterine wound is completed, then the traction sutures are cut short, the uterus is allowed to drop into the cavity (Fig. 10) and the abdominal wound is closed.

Advantages.—The high incision in suitable cases has two distinct advantages. First, there is less extensive handling of peritoneal surfaces, hence less peritoneal shock and less danger of infection from handling. Secondly, the incised uterus drops away from the abdominal incision, thus preventing adhesion and firm fixation of the incised uterus to the abdominal wall, which has proved a serious matter in some cases operated on by the usual incision.

This dropping away of the incised uterus from the abdominal wound is well shown in this case. Fig. 11 is a photograph taken seventeen days after delivery. The abdomen is everywhere resonant down to the pubic bone, showing that the uterus has dropped entirely away from the incision and that the intestines occupy all this region as in the normal condition. On deep palpation, the fundus uteri is felt in the pelvis as here outlined.

Of course, the high incision is suitable only for clean cases where it is permissible to open the uterus within the peritoneal cavity. When the uterus is infected, or possibly infected, the long incision should be used so that the uterus may be turned out before being opened. Again, when there is a probability that the uterus will have to be removed on account of a tumor or other complication, the low incision should be employed. For example, in one of my cases, the indication for the cesarean section was a fibroid blocking the pelvis, and there was strong probability that hysterectomy would be necessary. It was a clean case, so I made the usual hysterectomy incision, opened the uterus *in situ*, delivered the child and then brought the uterus outside the cavity. A careful examination was then made to determine if myomectomy were practicable. Finding that it was not, the uterus was at once removed by supravaginal hysterectomy. Such a case, though clean, was not suitable for the high incision. But in the majority of clean cases requiring cesarean section, the high incision will be found decidedly advantageous.

A CASE OF INTRA-ABDOMINAL OMENTAL TORSION.

By EDWARD K. ARMSTRONG, M. D., of Chicago,
Attending Physician, Cook County Hospital, Chicago.

J. H., *act.* twenty-two, an upholsterer, single, was admitted to the Michael Reese Hospital, at 2 p. m., October 21st, 1912, to the service of Dr. E. Wyllys Andrews, to whose kindness the writer is indebted for the privilege of reporting this case.

Patient had been sick for one week, complaining of a constant, dull, aching, localized pain in the right hypochondrium, accompanied by occasional hiccough, but no nausea, vomiting, jaundice or other symptoms. Past history negative except for yellow fever four years ago, a specific infection eight years ago, and gonorrhea three weeks before admission.

Physical examination revealed a robust young man of pasty complexion, with a coated tongue, two small ulcerated areas about the size of a pin's head on the roof of the mouth, a reddened pharynx and a few small glands on each side of the neck. The abdomen presented a considerable degree of rigidity over the upper half, perhaps more noticeable over the right quadrant, and there was marked tenderness below the costal arch along the outer border of the right rectus muscle. A definite resistance was to be felt in the same area extending two and one-half fingerbreadths below the costal margin, but there was no distension or demonstrable free fluid. No herniæ could be found. Gumming of the external meatus was present, a red scar $1/3$ cm. in diameter showed just behind the corona glandis on the right side of the penis, and the scrotum was liberally covered with small, slightly raised, reddened, weeping areas. There were many brown atrophic scars in the skin over the anterior surface of both tibiæ.

The urine showed 25 to 40 leucocytes to a field, but was otherwise negative. White count, 12,200. Temperature on admission, 99.2°F. , the maximum during the next eighteen hours being 99.6°F. , pulse 76. Blood drawn for a Wassermann test was reported as positive the afternoon following operation.

A diagnosis of probable cholecystitis was made and an exploratory operation undertaken the following morning.

On opening the abdomen through the upper portion of the right rectus muscle the liver was found somewhat contracted, its lower border above the costal margin; the fundus of the gall-bladder was normal in appearance, but the lower portion was slightly thickened; the ducts were negative. Examination of the stomach revealed only a few adhesions to

the under surface of the liver and to the first portion of the duodenum; but in bringing up the stomach, the great omentum presented, and a portion of its right border about $12\frac{1}{2}$ cm. long was seen lying upward between the gall-bladder and the stomach, with its tip adherent near the pylorus. This strand was twisted three times upon itself, the torsion being just distal to its attachment to the main portion of the omentum. A part of it was matted together into a ball 4 or 5 cm. in diameter, its veins were distended, and its color was a deep purplish red. Its point of adherence to the pylorus was so firm that its separation necessitated ligation of the bleeding point left behind.

The twisted strand was clamped in normal omental tissue, cut off, and the small stump ligated with absorbable catgut. The balance of the omentum was perfectly normal and its free border unattached. The abdomen was then closed without drainage and an uneventful recovery followed.

The laboratory reported that the specimen was composed of distended veins and fatty tissue showing hemorrhages and invasion by round and pus cells.

FREQUENCY OF OMENTAL TORSIONS.

The first case of omental torsion reported was that of Oberst, in 1882. Ten years later a second case was reported by Demons. After a lapse of five years 3 more cases were reported by Bayer, Monod and Eiselsberg. Since 1900 the reports have become more frequent, and in 1907 Le Jars was able to collect 66 cases. Subsequently some 50 odd cases have appeared in the literature, making a total approximately of 120 reported to date.

ETIOLOGY AND MECHANISM.

Richardson has defined torsion as a twisting of the omentum upon itself, causing sufficient obstruction to the circulation to produce strangulation. Matting only and strangulation from other causes should be excluded.

The varieties of omental torsion have been divided by Corner and Pinches into (1) abdominal, or torsion within the abdomen unaccompanied by hernia; (2) hernial, or torsion within a hernial sac; (3) hernial and abdominal—torsion not limited to a sac but extending into the abdomen.

The conditions necessary for the production of omental torsion are the formation of matted omentum at its free end or the formation of a second fixed point by the adhesion of the free extremity to some other structure. The first step in rotation is offered by the movements of the omentum in its function of circumscribing infectious processes occurring within its reach, it becoming attached by its free border, thus becoming fixed at both ends and forming an omental mass suspended from a pedicle. Exterior forces such as gastric or intestinal peristalsis, vigorous

exercise, prolonged coughing or trauma applied to the tumor start the twisting. Once started the increasing length of the inflamed and dilating veins tends to wrap them around the arteries, carrying the loose mesothelium with them, finally interrupting arterial flow and ending in complete strangulation of the omental mass.

The greatest number of torsions, 90 per cent., have occurred in connection with herniæ, only 7 of the 66 cases collected by Le Jars being of the intra-abdominal variety. Left-sided inguinal hernia is most frequently met with, but also femoral, umbilical, ventral and herniæ in laparotomy scars. Matting may be caused by tumors or inflammatory thickening, while adhesions may occur to a tube, ovary or ovarian tumor, appendix, epiploica, the abdominal wall, ileum, gall-bladder or stomach.

In the case here reported only one pedicle was found, that lying between the strangulated mass and its proximal attachment to the normal omentum. Whether rotation occurred before or after the adhesion of the distal end to the pylorus is an open question. Certainly no pedicle was found in that situation, but it might have been so small as to escape detection. Several cases have been reported in which the torsion was so great that the distal attachment had been torn loose, the thicker proximal twists remaining fixed. Adhesions resulting from the inflamed omentum are usually easily separable and one is inclined to believe that the first explanation is the correct one in this case.

SYMPTOMATOLOGY.

Omental twists are most frequent in middle life and preponderate in males in the ratio of two to one. It is not until sufficient torsion occurs to obstruct the return flow of blood that symptoms of strangulation present themselves. If the torsion is slow or incomplete, then there is only vague discomfort with or without ascites. If the omentum is partially or wholly in a hernial sac, the manifestations are those, as Bland-Sutton says, of a strangulated hernia minus stercoraceous vomiting.

The symptoms are for the most part mild, the onset rather sudden, with more or less severe abdominal pain, often in the right iliac fossa, not infrequently in the right hypochondrium. There is muscular rigidity, tenderness and dullness, and the pulse and temperature are both elevated, although they do not rise as rapidly as in the severer appendiceal affections. Vomiting occurs in 50 per cent. of cases, but is usually not excessive. Constipation is rare and distension usually absent. A tumor may sometimes be felt, irregular in shape, with borders undefined. Ascites has been noted and gastric or colonic hemorrhages do occur.

DIAGNOSIS.

Correct preoperative diagnosis is rarely possible, Rudolph being credited with the only one ever made. But fortunately the condition for

which it is mistaken usually requires early surgical intervention. Corner and Pinches lay stress on the fact that operative and not preoperative differential diagnosis is the important point. Overlooking a torsion occupying a remote portion of the abdomen might not be so unusual, cases being on record of death from a second undiscovered torsion.

The condition is usually mistaken for appendicitis, intestinal obstruction or strangulation, or peritonitis. The differential points of diagnosis are the less rapid rise of temperature and pulse than in appendicitis, the usually lower white count and the wider distribution of the tenderness. In torsion as opposed to intestinal obstruction, the bowels act readily and there is usually no severe vomiting. The condition should be suspected when, under these circumstances, there is no cessation of pain after a bowel evacuation.

A known old hernia should excite suspicion if symptoms of strangulation appear, while if there is an intrahernial mass continuous with a mass in the abdomen, or if an intrahernial mass is reducible without symptomatic relief, a probable diagnosis is possible.

PROGNOSIS.

The death-rate in operated cases has been quoted by Gillette as 13 per cent., but early operated cases recover without exception. If unoperated, the area of the strangulated mass, the degree of strangulation, and the location are the factors which determine the outcome. Unaided recovery seems possible, but gangrene would probably result in peritonitis and death.

TREATMENT.

Rarely, unwinding of the twisted pedicle has been attempted in the effort to relieve the circulatory obstruction and thus restore the vitality of the mass, but removal of the strangulated portion is the only safe procedure.

BIBLIOGRAPHY.

- Oberst (*Zentralbl. fuer Chir.*, pp. 661-67, 1882).
 Demons (*Revue de Chir.*, p. 159, 1893).
 Bayer (*Zentralbl. fuer Chir.*, p. 462, 1898).
 Eiselberg (*Deutsch. med. Wochenschr.*, p. 260, 1898).
 Monod: Thèse de Réquier, 1898.
 Rudolph (*Wien. klin. Rundschau*, Bd. XVII, pp. 794, 811, 835, 849, 1903).
 Corner and Pinches (*Amer. Journ. Med. Sciences*, Vol. CXXX, p. 314, 1905).
 Corner and Pinches (*Med. Chir. Tr., London*, Vol. LXXXVIII, p. 611, 1905).
 Richardson (*Journ. Amer. Med. Assoc.*, Vol. XLVIII, p. 1590, 1907).
 Le Jars (*Semaine méd.*, Vol. XXVII, pp. 73-77, 1907).
 Le Jars (*Archiv. prov. de Chir.*, Vol. XVI, p. 270, 1907).
 Gillette (*Amer. Journ. Obstet.*, Vol. LXIII, p. 112, 1911).

THE ARCUATE DISTRIBUTION OF *A. MESENTERICA SUPERIOR* AND *A. MESENTERICA INFERIOR*: SURGICAL SIGNIFICANCE IN INTESTINAL RESECTIONS.

By NORVELLE WALLACE SHARPE, M. D., of St. Louis.

I. The blood-supply of the intestine is derived from *A. mesenterica superior* and *A. mesenterica inferior*.

A. mesenterica superior springing from the anterior surface of the aorta a few millimetres below *A. coeliaca* is covered by the neck of the pancreas and crossed by *V. lienalis*. Its course is caudal with a gentle curve at first left lateral, later right lateral; its terminus approximates the right fossa inguinalis. Its branches are:—

A. pancreatico-duodenalis inferior.

Rr. intestini tenuis.

R. colicus medius.

R. colicus dexter.

R. ilio-colicus.

With the exception of the first branch (which delivers a portion of its current to the pancreas and anastomoses with *A. pancreatico-duodenalis superior* of *A. hepatica*) the entire output of blood is transmitted to the intestine. *Rr. intestini tenuis*, ranging from fifteen to twenty in number, spring from the left face of the artery, and are utilized in the supply of jejunum and ileum.

The three *arteriæ colica* spring from the right face of the parent stem and supply the cecum, ascending and transverse colon. At the distal extremity of the colonic area thus supplied there is to be noted a functional overplus for a substantial anastomosis, occurring between *R. colicus medius* and *R. colicus sinister* (of *A. mesenterica inferior*) is found.

A. mesenterica inferior springs from the left face of the aorta about 3 or 4 cm. above its ultimate bifurcation. Its course is caudal with a gentle curve at first left lateral, later right lateral; its terminus, *R. haemorrhoidalis superior*, is found to lie practically in the median line. Its branches are:—

R. colicus sinister.

R. sigmoideus.

R. hemorrhoidalis superior.

The output of *A. mesenterica inferior* is directed to the colon (transverse, descending, iliac and pelvic) from the proximal end where an anastomosis, as above noted, is effected between *R. colicus sinister* and *R. colicus medius* (of *A. mesenterica superior*) to the terminal *R. hemorrhoidalis*

superior. The major portion of the blood of the terminal branch is, however, directed to the rectum where a liberal anastomosis with *Rr. hemorrhoidalis inferiores* (of *A. pudenda interna*) is found.

II. From these well-known anatomic data, together with the fact that the intestinal blood-supply, exclusive of the two mesenterics, is highly insignificant, it may be inferred that an operator in his intestinal work need concern himself with but two arteries—*A. mesenterica superior* and *A. mesenterica inferior*.

III. The blood supplied by *A. mesenterica superior* and *A. mesenterica inferior* finds its destination in the intestinal wall. The adult intestine approximates 8 to 9 metres in length. The imperative necessity of rapidly



Intestinal Resection. Angular mesenteric incision. This drawing is instructive in that it may be noted that if the apical point formed by the two converging mesenteric incisions had been placed even further down in the arterial fork, and thus nearer to the root of the mesentery, clamping of several arterial twigs would be obviated. In end-to-end intestinal resection it is preferable to cut the bowel at right angle to its longitudinal axis. This drawing fails to exhibit this fact quite as accurately as it might have been shown.

and effectively distributing the blood to this extended area is accomplished by an elaborate system of arterial anastomosis and division largely dichotomous in character. As a result of this plan a tier of arterial arches is formed; these in turn undergo a similar process, and yet again, until in all a series of four, but quite frequently five, tiers of arches is to be noted. From the distal arcade course a vast number of terminal twigs which at the bowel wall finally divide to encompass the intestinal circumference.

A study of the two mesenterics (both at the operating table and in the routine material accessible in the Anatomical Laboratory of the St. Louis University) has led to the following conclusions:—

1. Dichotomous arcuation of *A. mesenterica superior* and *A. mesenterica inferior* obtains throughout the entire area through which they course.

2. Dichotomous arcuation of the colonic arterial supply (whether from *A. mesenterica superior* or *A. mesenterica inferior*), with its two and three, occasionally four, tier plan of arcading, is essentially identical in type with the more elaborate arcading of *Rr. intestini tenuis* (with its four, occasionally five, tier plan) which supply jejunum and ileum.

3. The distal system of distribution remains unchanged even in the presence of arterial anomalies, for in the comparatively rare instances in which they occur they are found to effect the primary branches rather than the distal arcades.

From the foregoing anatomical facts it may be seen that there is a geometric increase of arterial branches from the parent stem distally to the intestinal circumference, the actual multiplication depending upon the number of dichotomous divisions which are to be found in the particular radiating strip of mesentery which is under investigation. The reverse is obvious,—that investigation from periphery to centre will encounter arterial twigs diminishing numerically in a ratio inverse to the increase above noted.

IV. The practical significance of these facts in routine intestinal resection technique would seem to be so clearly self-evident as to make any discussion wholly gratuitous. That this is unfortunately not true is evidenced by a method of intestinal resection which has a large measure of popularity. The method in question is characterized by incision of the mesentery, throughout the entire section which is to be extirpated, parallel to, and in the immediate vicinity of, the bowel. It is obvious that by this method mesenteric section is made in the area that exhibits the largest number of arterial twigs; likewise the largest number of radicles of either *V. mesenterica superior* or *V. mesenterica inferior*, depending upon site of section. Furthermore, clinical experience shows that practically all these vessels require ligation, clamping or torsion.

In contrast may be placed the method which on anatomic grounds alone is unquestionably superior, i. e., section of the bowel and mesentery in such fashion that the lines of incision converge so as to meet (as the apex of a triangle) near the root of the mesentery.*

*Even to a casual reader a fair comprehension of the remarkable multiplication of arterial twigs in the mesentery proper (i. e., the mesentery of the small intestine) may be secured when it is recalled that its root is but 15 or 16 cm. long, and that from this narrow source blood must be transmitted to an area between 650 and 700 cm. in length. It should also be borne in mind that whereas the width of the mesentery is, as noted above, from 650 to 700 cm., its length (i. e., from root to bowel) rarely exceeds 15 cm. The enormous task of multiple ligations and clampings in the parallel-to-bowel mesenteric incisions is forcibly

V. In large measure due to the reiterated teaching of the past decade, in regard to importance of thorough hemostasis, accuracy of manipulation, accuracy of approximation and minute attention to technical details, the character of routine surgical measures has notably improved. On the other hand, it would seem to be true that the need for to-day among the majority of operators is an increase in operative speed. That this will make for a diminution of operative and post-operative shock is obvious; obvious, too, that it must needs be attained with no sacrifice of the technical advance of the past decade or two, to which allusion has been made. It is beyond question, as regard operative speed, ease of manipulation, simplicity and accuracy of hemostasis, and subsequent disposition of the mesenterico-intestinal flaps, that the angular mesenteric incision is vastly superior to any incision which strives to parallel the bowel.*

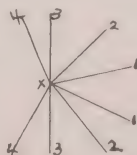
It would seem to be superfluous to observe that the more extensive the resection, the greater the number of arterial twigs that will demand ligation or clamping. So significantly is this true that if the parallel-to-bowel mesenteric incision be employed in an extensive resection, the task of multiple ligations becomes, in itself, a burden. And yet, it is in extensive resections that the angular mesenteric incision finds its most convincing field of usefulness. For even in extensive resections (provided the angular incisions be carefully placed) but few ligatures are indicated; while the subsequent reapposition both of mesentery and bowel may be accomplished with a readiness that is in striking contrast with the clumsy manipulations incident to other methods.

There is but one caution that it would seem advisable to record—namely, that in planning the two converging incisions, which are to embrace the mass to be resected, it is important to secure for the *termini* of the intestine an adequate blood-supply. This is readily accomplished by shifting the incisions a centimetre or two (either proximal or distal) in order to include encircling arterial twigs well up to the bowel margins that are to be subsequently approximated.

suggested by a study of any series of extensive resections. In a recent note on "The Effect of Extensive Resections of the Small Intestine," by Flint (*Bulletin Johns Hopkins Hosp.*, May, 1912), may be found an incomplete, though otherwise excellent, tabulation of 59 resections of the small intestine, each exceeding 200 cm. in length. The longest—540 cm.—is credited to Brenner.

*It needs but a moment's consideration to understand that that fashion of mesenteric section which the writer has arbitrarily styled the angular-mesenteric-incision, is most acutely angular when but a short length of bowel is being resected; becomes less acute with longer lengths; finally, will change to practically a continuous line; and in the case of massive resections will exhibit an obtuse angulation. The four degrees of angulation are schematically illustrated as follows: The apical point X being assumed to lie near the root of the mesentery and approximately midway in the jejuno-ileum area.

- 1.—1X1.
- 2.—2X2.
- 3.—3X3.
- 4.—4X4.



For the conservative surgeon who may hesitate to adopt the proposed angular incision of the mesentery, thinking it ultra-radical and tending to impair the intestinal blood-supply, it would be well to recall the clinical lesson taught us by intra-abdominal traumata, *i. e.*, a wound of the mesentery in the immediate vicinity of the bowel is much more liable to impair the blood-supply of the contiguous bowel segment than a similar wound near the root of the mesentery. The explanation lies in the abundant arterial anastomoses within the mesentery; and, further, that arterial inosculations become relatively infrequent and hence relatively inadequate in the immediate neighborhood of the bowel. From this the inference is justified, and clinical substantiation is at hand—that angular section of the mesentery in the vicinity of its root, if performed with care and accuracy, is a reasonable and safe surgical procedure.

SPECIAL ARTICLE.

TENDON REFLEXES AND BONE REFLEXES.*

By DR. J. BABINSKI, of Paris.

Lectures delivered at the Hospital de la Pitié, reported by Drs. Albert Charpentier and J. Jarkowski, and reviewed by the author.

(Translated, with some additions in brackets, by Charles Gilbert Chaddock, M. D., of St. Louis.)

The tendon reflexes and the bone reflexes deserve the most careful attention of clinicians because they are objective phenomena that cannot be modified by the will; because of the frequency of the diseases which disturb them; because of the value of the information which their examination furnishes. Study of them has led to progress in pathology that has abundantly rewarded efforts made in this branch of semeiology.

The hand, armed with the percussion hammer, summons the nervous system to speak, through these reflexes, and the replies obtained to the questions asked are clear. The revelations thus obtained are invaluable: the nervous system tells of the damage its tissues have undergone and tells in what parts the damage is located; sometimes, even, with the precision of a geometrician, it tells the seat and extent of the damage and warns of the grave dangers that menace. Such an interrogatory, from which deception and error are excluded, for one who understands this language, can in a few moments reveal secrets which were otherwise impossible of penetration.

Therefore, to learn to know accurately the tendon and bone reflexes, and then to take the pains to examine them systematically and methodically, are not minutiae; some peculiarity which at first sight appears to be an unimportant detail, sometimes becomes of major interest. I hope to be able to bring to my way of thinking those of you who care to follow these lectures with attention. I wish to say at the beginning that I do not intend to make a complete review of what has been written on this subject. My purpose is to emphasize the facts which appear

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essential to me, and here to unite the results of my personal researches scattered through various communications.

Definition.—We call the phenomenon a tendon reflex, a bone reflex, caused by the percussion of a tendon, of a bone, which consists of an involuntary, quick muscular contraction of short duration.

History.—The date of the discovery of the tendon reflexes seems difficult to fix. It seems probable that they had been known a long time before they were subjected to scientific study. But however that may be, neither in the ancient treatises on physiology where the reflexes in general (reflexes of defense) are studied in great detail, nor in pure clinical works, do we find indications concerning our subject before 1862. In that year Charcot and Vulpian noted 'foot-clonus,' studied this sign with method, pointed out with precision how to provoke it, and had an inkling of its clinical value. They likened it to the involuntary contractions observed by Brown-Séquard in certain spontaneous and experimental affections of the spinal cord, and grouped by him under the term 'spinal epilepsy.' But its exact significance and its close relations with the tendon reflexes were only later determined. The first systematic works on the tendon reflexes date from 1875; they are due to Erb, who studied especially exaggeration of these reflexes in 'spastic paraplegia,' and to Westphal, who at the same date called attention to abolition of the knee-jerk in several cases of tabes. These writers indicated the method of examining the patellar tendon reflex, and pointed out the possibility of provoking analagous contractions by the percussion of various other tendons. They considered 'foot-clonus' to be a phenomenon of the same order. Since that date investigations of the tendon and bone reflexes, in normal as well as in pathological conditions, have multiplied.

Nature of These Phenomena—Experimental Researches.—From the very beginning of studies of the muscle reaction following percussion of tendons, two opinions were expressed concerning its nature. While in his first communication Erb admits the contraction to be of reflex origin, Westphal thinks it due to direct excitation of the muscle; the latter adds, it is true, that it requires a certain degree of 'muscle tone' which is reflex in nature. This opinion was accepted by Eulenburg, Waller, de Watteville, and Beevor. In the same order of idea is the 'myotatic'* theory of Gowers, adopted by Sherrington and other physiologists.

Without going into the details of the arguments brought by the authors in support of different theories, I shall describe briefly the experiments devised to penetrate the secret of the mechanism of this reflex.

The first series of experiments, at the instigation of Erb, was undertaken by Schultze and Fuerbringer in 1875. These workers utilized the

*From the Greek: *Mus*, muscle, and *τενειν*, to stretch.

dog. They separated the patellar tendon of the triceps cruralis, and they were able to obtain a contraction of this muscle by percussion of the tendon or of the patella, a result which seemed to confirm Erb's theory. However, these experiments gave rise to various objections: it was pointed out that the vibration might be transmitted directly to the muscle by means of the bone and thus cause an idio-muscular contraction. Sternberg met this objection victoriously, by what experimental procedure we shall see later.

Other researches had as an object the determination of the exact rôle of the tendon. The discovery in 1875, by Dachs, of nerve endings in the tendons seemed to justify the hypothesis that the point of departure of a tendon reflex lay in the tendon itself. However, it was demonstrated that this is not the fact: Tchirieff, in 1878, and then Schreiber, replacing the tendon by a thread which they stretched to some extent, obtained a muscular contraction by percussing the thread. Later it was found that excitation of the tendon isolated from the bone and the muscle provoked no contraction whatever. There is no contraction when the percussion is made on a tendon that is supported against a resisting surface which prevents vibration. Therefore, in spite of having nerve supply, the tendon plays the rôle of an elastic band for the conduction of vibrations.

Are these vibrations conducted to the muscle or to the bone? A new problem. The experiments of Sternberg furnish its solution since they cannot be seriously criticized.

Sternberg proceeded as follows: the tendo achillis (rabbit) is separated from the muscle fibres and made tense by attached forceps. The common flexor of the toes is exposed to view [and is made tense by a thread and weight rigged over a pulley], and now percussion of the tendon causes contraction of the flexor muscle; and the same form of movement is obtained by percussion of the bone or of the articulation; it also occurs [to bone or joint or tendon percussion] after a section of the tibia has been removed, and no bone conduction of vibrations is possible. This experiment completes those of Schultze and Fuerbringer, and removes the objections which could be justly urged against them.

In another experiment Sternberg isolates the extensor muscles of the toes and the anterior tibial muscle of the rabbit with their tendons, and in such a way that these muscles are united to the body only by nerves and blood-vessels. The muscles and tendons are fixed by their extremities in a certain degree of tension. In these conditions, the muscles react to percussion of the tendon just as they do in the first experiment. But here the question arises: Is this a reflex contraction or simply an idio-muscular contraction? This question cannot be answered directly; however, the hypothesis that the contraction is reflex seems much the more probable if we reason about it by analogy: since the propagation of the tendon vibrations to the muscle produces exactly the same result as their

propagation by means of the bone—and in the case of the bone conduction the contraction is incontestably reflex—it is legitimate to identify these two phenomena, and to consider the vibration through the tendon, like that through the bone, a reflex. Let us note in passing that percussion of aponeuroses, of articulations, and of muscles may provoke reflex contractions identical with those I have just discussed.*

From the facts given there arises the physiological view, seemingly paradoxical, that there is not, properly speaking, a tendon reflex, since the contraction provoked by percussion of a tendon is due to the propagation of the vibrations to the bone or to the muscle, and the true point of departure of the reflex lies either in the bone or in the muscle. However, it is none the less legitimate to continue to call a tendon reflex the reflex movement resulting from percussion of a tendon, just as we call the reflex movement due to percussion of a bone, a bone reflex.

It should be noted that there is some difference between bone and tendon reflexes: the muscular contraction which follows percussion of a tendon is limited to or predominates in the muscle to which the tendon belongs; the percussion of a bone usually engenders reflex contraction in several muscle groups, sometimes in muscles lying a long distance from the point of excitation. But these differences are not fundamental. In reality, from the pathological point of view, there is absolute parallelism between bone reflexes and tendon reflexes, and clinically we cannot separate them.

Method to Be Employed in the Examination of Tendon Reflexes and Bone Reflexes.—In the examination of the reflexes there is possibility of numerous and costly errors of observation, if we neglect, as many physicians do, to follow certain rules.

I shall indicate the principal conditions to which such an examination must conform in order to be of value.

1. The member to be examined must be naked. The interposition of clothing between the skin and the percussion hammer presents several inconveniences: it makes the correctness of the blow difficult, diffuses its effect, and masks the muscle jerk which is sometimes the only manifestation of a feeble muscular contraction and which is insufficient to cause a movement of the limb struck.

2. During the examination it is important that the muscles of the segment of limb under examination be not contracted voluntarily, and that, as far as possible, they be in a state of relaxation. This condition is sometimes very difficult of realization; without more than mention of children and mental patients who object to examination and spoil it by gesticulating and making themselves stiff, there are certain persons who, notwithstanding the best of will, succeed only with difficulty or not at all in relaxing the muscles. The more they try, the less they succeed. In

*This reflex muscular contraction must not be confounded with the idio-muscular contraction which takes place without the intervention of nerve centres.

order to attain the desired end, it may be necessary to blindfold them, distract the attention by conversation, or, finally, cause the subject to induce a vigorous contraction of muscles in some part of the body distant from the part under examination. When, for example, the knee-jerk is under examination, we ask the subject to grip his hands one in the other with fingers interlaced and to pull forcibly; at the instant this is done, the tendon is struck. This is the valuable procedure due to Jendrassik. In examining the reflexes of the upper extremity, which are often difficult to obtain, the subject may be required to make a fist on the opposite side. Sometimes we are successful through a simple change of position: the subject, who seated, contracts his muscles, may relax them when lying down. By palpation we note the state of the muscles, and if necessary we wait patiently for the opportune moment to practise percussion.

3. The tendons should be in a certain state of mechanical tension which may be realized usually when the limbs are placed in positions which I shall describe later and which ordinarily are the most convenient for examination of the various reflexes from bones and tendons. But with regard to this there are individual differences: it may be necessary to place the segment of a limb in varied positions and try before finding the one most favorable for induction of the reflex movement.

4. I come to the act of percussion. It should not be practised, as many still do, with the cubital border of the hand, a procedure having inconveniences, one of which is that the blow is thus delivered on too extensive a surface. A percussion hammer should be used, of which there are several models. There are two which I usually employ. One has a nicked steel handle from 20 to 25 cm. long, fixed in the centre of a circular steel disc 3 cm. in diameter, provided with a groove around the circumference deep enough to carry a rubber ring [which, when sprung into place, provides the disc with a circumferential rubber cushion about $\frac{1}{2}$ cm. in thickness; this model is varied by having the head-end of the handle forked with two prongs and with holes for reception of these so arranged that the handle can be sprung into the head at right angle to the head, or in the plane of the circumference of the head. For this purpose the head of the hammer is made thick enough to receive the forked handle in the plane of its circumference. This model has the advantages of both that are described here]. The other model, which may be more conveniently carried in the pocket, has a similar handle, but the disc is replaced by a rectangular steel plaque which receives the handle so that the handle and periphery of the head lie in the same plane; it is provided similarly with a peripheral rubber edge. These hammers have enough elasticity to fit them for the use in question.

The examiner delivers on the tendon or the bone that he proposes to excite, a quick blow of a certain force, but not too forcible; when the force of the blow is excessive it is painful, and pain, in itself objectiona-

ble, is still more regrettable because it brings about usually muscular reactions which vitiate the observation of the reflex contraction; when the blow is too weak, it is without effect. It is impossible to give the measure of force and the degree of quickness with which the blow should be delivered; it is a matter of experience. As it were, automatically, one learns to percuss tendons and bones correctly, just as in playing at billiards one learns to make a 'follow' or a 'draw.'

I shall now indicate the attitudes which seem the best for the examination of each reflex, and also the points to be struck for the bone reflexes, while emphasizing more particularly five reflexes which seem to me to be constant:—

- (a) Reflex of patellar tendon, or of triceps cruralis.
- (b) Reflex of tendo Achillis, or of triceps suralis.
- (c) Reflex of triceps brachialis, or of extension of forearm.
- (d) Flexor reflex of forearm, or of inferior extremity of radius.
- (e) Reflex of pronation of the hand.

(a) *Patellar Reflex or Reflex of the Triceps Cruralis.*—There are several good positions, and each should be tried in case of doubt.

1. Legs crossed while seated; a position difficult for stout persons.

2. The subject is seated; the legs are at an obtuse angle with the thighs, the feet touch the floor at the heel.

3. The subject lies on the back; the heel touches the plane of repose; the limb flexed somewhat at the knee is supported at the popliteal hollow by the forearm of the examiner.

4. The subject is seated on a table with the limbs hanging free.

(b) *Reflex of the Tendo Achillis or of the Triceps Suralis.*—The best position is the one I first indicated, and which has been adopted by all neurologists: the subject kneels on a chair [with the feet projecting free of the seat of the chair, and with the subject's hands grasping the back of the chair to insure steadiness, and as a convenient means of employing 'reinforcement' (Jendrassik)]; but if for any reason the subject cannot be placed in this position, if he cannot quit the bed, he may be examined while lying on the side with the leg slightly flexed on the thigh, and the extremity of the foot sustained by one hand of the examiner. [If the subject in bed cannot be placed on the side, the limb can be well rotated outward and slightly flexed at the knee, the examiner putting the tendon in mild tension by upward pressure with one hand on the ball of the foot, and the tendon is freely accessible for the blow of the hammer. Ordinarily the reflex of the tendo Achillis can be tested satisfactorily with the patient seated in a chair with the feet resting flatly on the floor and the limb bent at the knee slightly beyond a right angle.]

(c) *Reflex of the Triceps Brachialis or of Extension of the Forearm.*—The upper extremity is lifted outward and backward by the examiner, who supports it at the bend of the elbow with one hand, while the forearm is at an obtuse angle with the arm. Another position which seems

to me to be preferable is the following: The attitude of the upper extremity is similar to the preceding, but instead of sustaining it at the bend of the elbow, the subject rests the palm of the hand on the thigh of the examiner, both seated. It should be noted that in this position the forearm is immobilized and the muscle jerk alone is visible.

Extension of the forearm may be obtained by percussing along the lower third of the ulna. [With the subject on his back in bed, the examiner may grasp the wrist and bring the arm gently across the chest with elbow flexed at an obtuse angle, thus exposing the tendon of triceps to the blow.]

(d) *Reflex of Flexion of the Forearm or Reflex of the Lower Extremity of the Radius.*—The forearm, somewhat flexed on the arm, is brought into semipronation and supported by the left hand of the examiner at its lower extremity (wrist). The lower extremity of the radius is percussed, and thus a contraction of all the flexors of the forearm is induced.

Flexion of the forearm is also to be obtained by percussion of the tendon of the biceps [when the forearm is sustained in semiflexion], but the movement is usually less pronounced by this method, perhaps because usually the contraction is limited to the biceps muscle. We may also provoke—not always, to be sure—flexion of the forearm by percussing the lower extremity of the humerus and different parts of the forearm, except the lower third of the ulnar area of which I have just spoken apropos of the reflex of extension.

Ordinarily, I repeat, percussion of the lower extremity of the radius causes the most energetic reflex movement of flexion. This is the point of election. Sometimes percussion of this point provokes also flexion of the hand and of the fingers.

(e) *Reflex of Pronation.*—The upper extremity is placed in the same position as in examining for the reflex of flexion. The movement of pronation is obtained either by percussing the antero-inferior part of the radius or the postero-inferior part of the ulna; hence the name 'cubito-pronator reflex' proposed by Marie and Barré. [This reflex movement usually can be induced as follows: With the arm in the position indicated, while supporting it at the wrist in his palm, the examiner presses the point of his thumb inward and over the internal border of the ulnar prominence in such a way that the ulna is lightly pressed away from the radius; the examiner then taps his own thumb at the middle of its terminal phalanx, and there results a distinct movement of internal rotation of the forearm (pronation). This procedure has the advantage of eliminating unnecessary and confusing movements of the forearm that occur often when the blow of the hammer is delivered directly on the radius or on the ulna—sidewise movements of the forearm; and it would seem that it brings out the reflex movement by means of sudden increase of tension of the pronating muscular mechanism, for in this method there is small possibility of causing vibration of the ulna.]

Percussion of the lower extremity of the ulna, in certain subjects, like percussion of the lower end of the radius, provokes, besides the constant reflex, a reflex movement of flexion of the hand and of the fingers.

Such are the principal rules and the general indications that should be followed in the examination of tendon reflexes and bone reflexes. I shall later have occasion to point out the gross errors too often made by those who fail to be guided by these rules.

(To be continued.)

MEDICAL AND SURGICAL PROGRESS.

TREATMENT OF CANCER BY RADIOTHERAPY.

A REVIEW OF RECENT LITERATURE.

By MOYER S. FLEISHER, M. D., of St. Louis.

1. Exner (*Wien. klin. Wochenschr.*, No. 29, 1913).
2. Bumm (*Deutsch. med. Wochenschr.*, p. 1017 and p. 1181, 1913).
3. Falk (*Deutsch. med. Wochenschr.*, p. 1177, 1913).
4. Kroenig and Gauss (*Muench. med. Wochenschr.*, Nos. 7-8, 1913).
5. Gauss and Krinski (*Deutsch. med. Wochenschr.*, p. 1182, 1913).
6. Schindler (*Wien. klin. Wochenschr.*, Nos. 36-37, 1913).
7. Jung (*Deutsch. med. Wochenschr.*, No. 31, 1913).
8. Turner (*British Med. Journ.*, March 22nd, 1913).
9. Wickham (*Deutsch. med. Wochenschr.*, p. 391, 1913).
10. Krömer (*Deutsch. med. Wochenschr.*, p. 1231, 1913).
11. Werner (*Berl. klin. Wochenschr.*, No. 10, 1913).
12. Keetman (*Berl. klin. Wochenschr.*, No. 39, 1913).
13. Döderlein (*Deutsch. med. Wochenschr.*, p. 1182, 1913).
14. Lazarus (*Deutsch. med. Wochenschr.*, p. 1177, 1913).
15. Krukenberg (*Muench. med. Wochenschr.*, No. 38, 1913).
16. Pinkuss (*Deutsch. med. Wochenschr.*, No. 36, 1913).
17. Meidner (*Therap. der Gegenwart*, No. 10, 1913).
18. Jungmann (*Wien. klin. Rundschau*, No. 38, 1913).
19. Geyer (*Deutsch. med. Wochenschr.*, No. 30, 1913).
20. Freund (*Wien. med. Wochenschr.*, No. 38, 1913).
21. Krause (*Berl. klin. Wochenschr.*, No. 13, 1913).
22. Meidner (*Therap. der Gegenwart*, No. 4, 1913).
23. Rotter and Bichél (*Deutsch. med. Wochenschr.*, p. 1177, 1913).
24. Pinch (*British Med. Journ.*, January 25th, 1913).
25. Freund (*Deutsch. med. Wochenschr.*, No. 43, 1913).
26. Holzner (*Præg. med. Wochenschr.*, No. 31, 1913).
27. Hirschfeld and Meidner (*Zeitschr. fuer klin. Med.*, Vol. 77, Nos. 5 and 6, 1913).
28. Freund and Kaminer (*Wien. klin. Wochenschr.*, No. 6, 1913).

INTRODUCTORY.

Of the known radioactive substances only a few are now in use in medicine, and only three or four have found application in the treatment of cancer. These substances are radium, radium emanation, mesothorium, and thorium. The therapeutic activity of all these substances is due to their giving off certain kinds of rays which in the main are the same in all four substances.

Three kinds of rays are given off by these radioactive substances—alpha, beta, and gamma rays. The α -rays are soft—that is, have relatively

little penetrating power. These rays carry a positive charge, and it is definitely proved that they are corpuscular in character. It has been proved that they are double atoms of helium. The penetrating power of these rays is dependent upon their initial velocity, the velocity at which they leave the parent substance; the initial velocity of the α -rays is not the same for all substances, but is constant in all specimens of one substance. Those rays possess the power to ionize air, have photographic action, and are able to produce fluorescence in sensitive substances. Owing to the fact that these α -rays possess but slight penetrating power, they are used only when relatively superficial lesions are to be acted upon; and at the present time, even in superficial lesions, many do not use them. In deeper lesions they are entirely removed by use of metal screens or filters. They are absorbed by the tissue at the depth to which they penetrate and there exercise their action; it is therefore evident that they would exert a harmful influence upon the epithelium overlying deep-seated lesions upon which one might desire to act with other more penetrating rays. The α -rays may be entirely absorbed by the use of very thin layers of aluminium, lead, etc. (probably 0.1 mm. would absorb the α -ray produced by any of the known radioactive substances). These so-called α -rays have within the last few years come to be known as α particles in view of the fact that they are corpuscular in character.

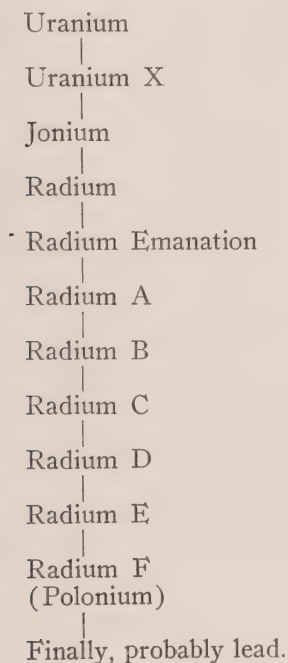
The β -rays are similar to the α -rays, inasmuch as they are corpuscular in character, but in contrast to the α -particles they are negatively charged; they are very much smaller than the α particles, measuring only 1/1700 of the mass of a hydrogen atom. The β -rays, which were formerly known as Becquerel rays, possess ionizing, photographic and fluorescence-stimulating qualities similar to the α particles. The β -rays, being very much smaller in mass than the α -rays, do not act as strongly in ionizing, etc., as do the latter, but owing to the greater velocity with which they leave the radioactive substances their action is evident at greater distances. Measuring velocity in terms of light, it has been found that the β -rays have a velocity varying from about 1/3 that of light to almost the velocity of light. Their penetrating power is, therefore, very much greater than that of the α particles, but even they are usually not used in cancer work, as their penetrating power is very much less than that of the γ -rays. When the β -rays are not completely absorbed, secondary rays arise, d -rays (delta), which have a very small velocity and which are readily absorbed by a sheet of paper or a thin sheet of rubber. The β -rays are very similar to, if not identical with, the cathode rays produced in the Crookes tube.

The γ -rays are those which at present are used in the treatment of cancer. They are very penetrating and are similar to the Roentgen or x -rays, being, however, more penetrating even than these. The γ -rays are not supposed to be corpuscular in character, but are generally considered to be electromagnetic vibrations of the ether, similar to light rays. Some few investigators do consider those rays to be corpuscular like the α - and β -rays, but no definite evidence has been adduced to support this belief. The γ -rays arise from the radioactive substance itself, thus from the same substances as do the β -rays; in this they differ from the x -rays, which are secondary to the cathode rays; hence γ -rays have never been observed in any radioactive substance which does not give out β -rays.

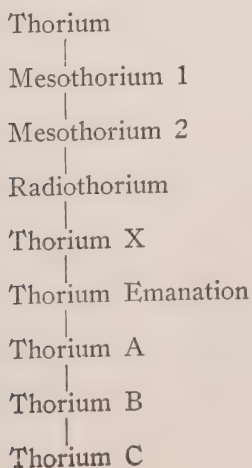
The penetrating power of the γ -rays is one hundred times as great as that of the β -rays, and they will penetrate lead plates several centime-

tres in thickness. Indeed, radiographs taken with γ -rays instead of the x -ray would give very indistinct pictures, as the γ -rays penetrate bones as readily as they penetrate the soft parts of the body. As is the case with both α - and β -rays, the penetrating power of the γ -rays of the different radioactive substances varies.

The two types of radioactive substances which are now used in the treatment of cancer are of two separate families. Radium is the first member of the so-called radium family, which, however, is in all probability a member of the uranium family. This family runs as follows:—



The thorium family in which thorium X and mesothorium occur is as follows:—



Both mesothorium and thorium X are solids. Thorium X sends out only α and β particles and therefore has only a limited applicability. It may be used for injection into a tumor or for superficial tumors. Thorium X has only a relatively short period of activity; after three to four days it gradually diminishes in activity. Mesothorium, which gives off both β - and γ -rays, but no α -rays, has a very much longer period of activity and increases in power up to about three and a quarter years; after twenty years half of the activity will have been lost. When speaking of mesothorium, both mesothorium 1 and 2 are considered. The measurement of the activity of the mesothorium preparations is made by a comparison of the γ -rays with the similar rays of a radium preparation.

Radium is a solid and is usually used as the chloride, bromide, or carbonate. The preparations are usually measured by the weight of the salt, not by the weight of contained radium, which would be the proper method. Radium gives rise to all the types of rays. Radium emanation is a gas which is used either dissolved in water or mixed with atmospheric air in a small confined space. Radium maintains its activity for many hundred years, and therefore to all intents and purposes its activity is constant. Radium emanations are broken down rather rapidly and give rise to other active substances, which give off all three kinds of rays. Radium itself does not seem to have γ -rays, but radium B and some of the latter products do give off these rays.

There are many and various methods of measuring the activity of the radioactive substances. The constant of measurement adopted at the Radium Congress in Brussels in 1910 is known as one Curie, which is the emanation sent out by one gram of metallic radium. The activity is also expressed in Mache units or in electrostatic units. One Curie is equal to $2.67:10^6$ of the latter and $2.67:10^9$ of the former. Sometimes the dosage of the radioactive substances is expressed very roughly in gram—or milligram—hours (the weight of the radioactive substance multiplied by the hours of exposure).

RADIOACTIVE SUBSTANCES IN CANCER.

Radium has been used in the treatment of cancer for about ten years, but it is only within the last two or three years that very definite results have been obtained. Wickham and Degrais both advised the use of massive dosage, long exposure with large quantities, and filtration to do away with the non-penetrating α - and β -rays. And it is only since these methods have been adopted that definite success in causing the retrogression of cancer has been obtained.

Exner, who has been working now for some ten years with radium, has obtained especially good results in carcinomata of the skin, in some cases with extensive and rather deep lesions. He has seen several cancers of the esophagus improved, but, on the other hand, has seen perforations and death in 2 cases. In 2 cases in which the cancer had been treated, one seven and the other nine years previously, there was a recurrence of the cancer. Exner warns against too small dosage, and believes that this may lead to a stimulation of growth, and in some cases to perforation into serous cavities or to hemorrhage. He strongly recommends treatment with radium exposures in cases in which it has not been possible to do a radical operation. He believes in the efficacy of radium in healing cancer, but will not at the present time express himself regarding the permanent results of this treatment.

Bumm, using a combination of x -ray and mesothorium in gynecological cases, found a gradual diminution of the secretion, retrogression of the tumor, and finally cicatrization. He could not notice a selective action of the x -rays for the tumor tissue.

Falk, who studied the absorption of the γ -rays by the skin as compared with the absorption by a skin tumor, was not able by this means to discover any selective absorption, or action of these rays. Bumm notes that the action of the exposure may result either in a throwing off of the surface of the tumor or a gradual absorption of the tumor mass. In order to determine to what depths the rays acted, 2 cases were studied histologically in which the healing was apparently complete, and in both cases living tumor cells were found deep under the cicatricial tissue. In a very large percentage of the cases treated there has been an apparent cure, in many others betterment. Bumm has, however, seen untoward effects—perforation of the bladder, necrosis of the uterus (the latter due to excessive dosage). He advises the use of this combined treatment either as a preliminary to operation or in operated cases to prevent a recurrence.

Krönig and Gauss, who have used large quantities of mesothorium, having had 800 mgrm. at their disposal, advise first that the α - and β -rays be removed by filtration; this may be accomplished by the use of 3 mm. of lead, $3/4$ mm. gold, or $1/2$ mm. platinum. They have used in their work a very thin capsule small enough so that it could be used in passages of small lumen; secondly, they use very large doses and frequent long exposures. These two points represent the new method, while the use of short exposures with unfiltered rays represents the old method. In myomata of the uterus they use in the vagina capsules containing from 25 to 50 mgrm. of mesothorium. They believe, but bring no proof, that the rays act specifically on tumor cells.

They have treated 23 cases of carcinoma with the old method, all of which died; 56 have been treated with the new method; 18 have apparently been cured, 5 died and 17 are still under treatment; the remainder withdrew from treatment. Twenty-one cases have been treated with the new method to prevent recurrence, and in none has there been a recurrence as yet. The majority of these cases have been treated over a year. Krönig and Gauss state that the cancer does not completely disappear, but some small rests seem to remain.

In treating myoma Gauss and Krinski, after an average exposure of 176.5 hours, found that 30 cases out of 42 have been completely cured.

Schindler, who used radium bromide and has compared the effect of large doses of exposure with that of small doses (14,000 milligram-hours he considers a large dose), obtains better results with the former. He finds that even 11 or 12 mgrm. of radium will give good results when continuous exposure is used. He warns, however, against the stimulating effect of the small doses. His opinion regarding the use and applicability of radium in the treatment of cancer is very similar to that of Bumm.

Jung treated 4 cases of inoperable cancer of the uterus and vulva with 100 mgrm. of mesothorium in 2 mm. lead filters with apparent good results; whether there has been a permanent cure cannot be stated as yet.

Turner treated 11 rodent ulcers with radium and 7 were cured. Of 12 cancers only one has been cured. Wickham, using mesothorium, also reports cures in relatively benign conditions of the epithelium. Krömer, who used x -ray and mesothorium combined, reports cures, or at least

clinical cures, in 2 cases of cancer of the uterus, and in a number of cases believes that this treatment, as a preliminary, aided the operation.

Werner used x -ray and radium, and as an aid to the exposures an injection either of cholin urate or borcholin—a combination of boric acid and cholin—into the tumor (this latter in order to sensitize the tumor cells). Werner also used vanadium electrosol for this purpose. Of 171 cases treated, Werner claims cures in 122. He has also used for injection into the tumor a paste containing thorium X, but he does not give any clear idea of the results of these injections. He believes rather in the importance of the duration of exposure than in the quantity of the radioactive substance used. We find, on the other hand, Keetman stating that activity or quantity of substance cannot be replaced by time of exposure. In this statement Keetman is supported by Doederlein, who states that 100 mgrm. should be used, and by Lazarus, who advises the use of not less than 30 mgrm. of radium salt.

Werner does not claim an absolute cure as a result of this treatment, as he has seen recurrences in cases, apparently entirely cured, not only in cases of cancer in internal organs, but also in cases of epithelioma.

Krukenberg, in order to concentrate the radioactive rays upon the cancer itself, advises the injection of calcium tungstate into the tumor. His results have not progressed sufficiently to allow of any definite judgment.

In cases of cancer, Pinkuss has used, with good results, injections of thorium in combination with aluminum hydroxide. He uses mesothorium rays for treating the cancer externally and does not remove all the secondary rays arising from the β -rays, as he believes they are of use in treatment. In addition he advises the administration of thorium X, either by mouth or by intravenous injection, or possibly by internal medication with pancreatin. In some cases he used thorium X injections and intravenous injections of borcholin. In still other cases he combines thorium treatment with intravenous arsenic injections. In all these proceedings he has seen the tumor become stationary, but reports no positive cures.

Lately Meidner has obtained promising results in inoperable cases of cancer of the colon or esophagus, and urges the use of mesothorium in all such cases, at least as a palliative.

Jungmann believes that radiotherapy has a distinct place as an aid to surgery in preparing for the operative procedures.

In nævi, keloids and similar superficial lesions, the radioactive substances are credited with exceptional curative powers. Geyer finds that nævi, when exposed to the unfiltered rays for a relatively short exposure, are soon replaced by scar-tissue. In keloids the deeper acting rays are more useful, and therefore it is best to filter out the α - and β -rays. Geyer prefers radium to mesothorium. Freund advises the use either of radium or mesothorium and makes use of longer and more frequent exposures, using exposure up to the point either of epilation or erythema. Similar to Geyer, he advises the use of the γ -rays in treating keloids, or resort to surgery and then the use of the γ -rays.

Krause, who used injections of thorium directly into the tumor in the form of a paste, reports negative results.

Falk claims never to have seen complete healing, and Meidner, who notes in most cases a definite clinical improvement with retrogression of the tumor, is sceptical as to whether or not the tumor cells are all destroyed. Rotter and Bichel also were able to note only a definite influence of radiotherapy in cancer, but no definite cures.

Pinch, who found the effect of radium to be very active in the treatment of *nævi*, noted betterment of cancer cases, but no cures.

Freund recommends very high dosage of rays and believes that the tumor should be acted on from two sides, and with sufficiently energetic rays, so that they will penetrate far beyond the tumor. He is not very optimistic regarding the final results with radium. He has noticed recurrences four years after apparent cures, and doubts whether it is possible to bring sufficiently strong rays to act upon the tumor without doing great injury to other organs.

Holzner, who treated a case of lymphosarcoma of the axilla by giving radium emanations by mouth, did not see any effect on the tumor. He studied the metabolism of this patient and found the urinary nitrogen and uric acid to be increased, and also an increase of the myeloid elements of the blood and a decrease of the lymphoid elements. Whether these changes were due to the radium or to the continued growth of the tumor could not be determined.

Hirschfeld and Meidner tested the toxicity of thorium X and found dogs to be quite susceptible to this substance. They died within a short time. In humans they found that small doses of thorium X increased, while large doses decreased, the leucocytes; the lymphocytes seemed to be the most sensitive to this substance. They are not optimistic regarding the use of thorium X in leukemia or cancer.

The results of some experiments of Freund and Kaminer are of interest. They have shown that in the blood and tissues of normal individuals there is a substance which destroys tumor cells. In organs where a tumor is present this substance is lacking. This substance they have identified as a fatty acid. They find that exposure of the normal tissues to the x -ray destroys this substance, while radium does not; and, furthermore, radium causes the appearance of this acid in cancerous organs where it did not exist before the exposure. Furthermore, radium reduces the affinity of cancer cells for carbohydrates (which affinity Freund and Kaminer have shown to exist), while the x -ray does not. It, therefore, appears that radium is more active than x -ray in inducing changes which might be interpreted as unfavorable to the development and growth of cancer.

Summarizing the work and evidence, we find that at present the treatment of cancer by radioactive substances is, as far as definite evidence of cure is concerned, still awaiting the verdict which only time can give. It is certain that tumors are very markedly influenced by treatment with the *gamma* rays. Tumor cells are destroyed by the treatment as practised at present. The use of massive doses, long exposures, and the filtering out of the *alpha* and *beta* rays represents an improvement over older methods. Whether the use of sensitizing substances, such as borocholin, or fluorescent materials, will prove to be a further improvement is still in doubt.

FILTERABLE VIRUSES AND NEWLY DESCRIBED MICRO-ORGANISMS.

A REVIEW OF RECENT LITERATURE.

By RALPH L. THOMPSON, M. D., of the Editorial Staff.

1. Wolbach: The Filterable Viruses: A Summary. (*Journ. Med. Research*, Vol. 27, No. 1, 1912.)
2. Compilation of the Work of Major Walter Reed and the Yellow Fever Commission, Document No. 822, 61st Congress, 3rd Session.
3. Ashburn and Craig (*Journ. Infect. Dis.*, p. 440, 1907).
4. Nicolle, Conor and Conseil (*Ann. Inst. Pasteur*, Vol. XXV, No. 2, p. 97, 1911).
5. Goldberger and Anderson (*Journ. Amer. Med. Assoc.*, p. 791, September 16th, 1911).
6. Cantacuzene (*Compt. rend. Soc. de biol.*, Vol. LXX, No. 10).
7. Bernhardt (*Deutsch med. Wochenschr.*, p. 403, March 17th, 1911, and p. 791, April 27th, 1911).
8. Landsteiner, Levaditi and Prasek (*Ann. Inst. Pasteur*, Vol. XXV, No. 10, p. 754, October, 1911).
9. Tyzzer (*Journ. Med. Research*, Vol. XI, No. 1, 1904).
10. Mallory (*Journ. Med. Research*, Vol. X, p. 483, 1904).
11. Flexner and Noguchi: Experiments on the Cultivation of the Micro-organism Causing Epidemic Poliomyelitis. (*Journ. Exper. Med.*, Vol. 18, No. 4, October, 1913.)
12. Noguchi: Contribution to the Cultivation of the Parasite of Rabies. (*Journ. Exper. Med.*, Vol. 18, No. 3, September, 1913.)
13. Moon: The Organism of Rabies, etc. (*Journ. Infect. Dis.*, Vol. XIII, No. 2, September, 1913.)
14. Williams: Cultivation of the Rabies Organism. (*Journ. Amer. Med. Assoc.*, Vol. 61, No. 17, October 25th, 1913.)
15. Noguchi and Cohen: Experiments on the Cultivation of the So-Called Trachoma Bodies. (*Journ. Exper. Med.*, Vol. 18, No. 5, November, 1913.)
16. Bunting and Yates: Culture Results in Hodgkin's Disease. (*Archiv. Int. Med.*, Vol. 12, No. 2, August, 1913.)
17. Negri and Mieremet (*Zentralbl. fuer Bakteriol.*, Vol. LXVIII, p. 292, 1913).

In a recent review Wolbach calls attention to the fact that, although our first knowledge of filterable viruses dates from 1898, there are now thirty diseases known to be caused by them. By filterable viruses we mean micro-organisms which will pass through filters, the pores of which are too small to give passage to ordinary bacteria. While the term 'ultra-microscopic' is often used as synonymous with 'filterable,' some of these

organisms, for example that of pleuropneumonia of cattle, have been cultivated.

While the largest list of these diseases caused by filterable viruses is that of domestic animals, nevertheless there is a considerable number common to man and animals, for example, foot-and-mouth-disease, rabies, vaccinia and variola. The diseases peculiar to man include yellow fever, molluscum contagiosum, dengue fever, verruca vulgaris, trachoma, poliomyelitis, typhus fever, measles and scarlet fever.

The filterable nature of the virus of yellow fever was discovered by Reed and Carroll in 1901. For dengue fever Ashburn and Craig described filterability in 1907. Nicolle obtained a filterable virus from typhus fever in 1910, and 1911 Goldberger and Anderson found a virus in the blood, buccal and nasal secretions of measles that would pass through a Berkefeld filter. With scarlet fever virus Cantacuzene and Bernhardt have infected monkeys, and Landsteiner and Levaditi were successful with chimpanzees.

In many of these diseases organisms have been described (in some instances many different organisms in the same disease). Much doubt exists where only morphological proof is at hand as to whether certain bodies described are protozoa or merely degeneration products included in the cells. For instance, bodies have been described in vaccinia and variola by Guarnieri, by Tyzzer, and by Councilman, Brinckerhof and Magrath, and in scarlet fever by Mallory.

This brings us down to three of these diseases which are much in the public eye at the present time owing to the work of Flexner and Noguchi, who have cultivated organisms in poliomyelitis, and Noguchi, Moon and Williams on the cultivation of the parasite of rabies, and Noguchi and Cohen on the cultivation of the so-called trachoma bodies.

Flexner and Noguchi summarize their work on the poliomyelitis organism as follows: "By employing a specially devised method there has been cultivated from the central nervous tissues of human beings and monkeys—the subjects of epidemic poliomyelitis—a peculiar minute organism that has been caused to reproduce the symptoms and lesions of experimental poliomyelitis. The micro-organism consists of globoid bodies measuring from 0.15 to 0.3 of a micron in diameter, and arranged in pairs, chains, and masses, according to the conditions of growth and multiplication. The chain formation takes place in a fluid medium, the other groupings both in solid and fluid media. Within the tissues of infected human beings and animals the chains do not appear.

"No statement is ventured at present as to the place among living beings to which the bodies belong. It is obvious that the cultural conditions are those that apply more particularly to the bacteria.

"The micro-organism passes through Berkefeld filters and the filtrates yield upon recultivation the peculiar micro-organism contained within the filtered culture. Moreover, Berkefeld filtrates prepared from the nervous tissues of infected human beings and monkeys yield also in culture the identical micro-organism.

"By employing a suitable staining method the micro-organism has been detected in film preparations and sections prepared from human nerve tissues, and from the corresponding tissues of monkeys inoculated with the usual virus or with cultures or filtrates prepared from monkeys previously injected with cultures. From all the infected materials mentioned, irrespective of the manner of their origin, the micro-organism has been recovered in cultures. As would be expected, it is more uniformly

recoverable from the original nerve tissues than from filtrates, and doubtless for the reason that in the former it exists in greater abundance."

In rabies, although the characteristic bodies of Negri are well known and even considered diagnostic of the disease, and although many other granular and pleomorphic particles have been described, and although several investigators have demonstrated the filterability of the virus, nevertheless the nature of the virus itself has remained unknown. Noguchi reports briefly the results of fifty series of cultivations made with the brain of animals infected with 'street' virus, 'passage' virus and 'fixed' virus. He finds in the cultures minute granular and coarser pleomorphic chromotoid bodies which reappear in new cultures following transplantation through many generations. Some of these bodies he has found to be nucleated and surrounded by a membrane. The disease has been produced in animals by inoculation with his cultures. The work of Moon and of Williams consists in passage of the virus from culture to culture and producing rabies in animals with the fourth and fifth generation of such cultures. Moon states that on microscopical examination of his cultures many organisms were found which resembled Negri bodies, but that they might be broken-down cell nuclei. (Cultures were made on fresh brain matter taken from a normal dog.) Williams takes decided objections to Noguchi's conclusions and suggests that his successful inoculations may have been due to the presence of the original material rather than to the results of growth of an active organism. In any event progress seems to have been made towards the identification of the rabies organism.

Again it is Noguchi who has succeeded in cultivating the so-called trachoma bodies. These bodies were first described by Prowazek and Halberstädter in 1907. Much discussion has arisen over these bodies; Herzog advanced the theory that they were merely transformed gonococci and Williams regarded them as degenerated forms of the Koch-Week's bacillus. Noguchi obtained in pure culture an organism from cases of conjunctivitis accompanied by the so-called trachoma body inclusions, and also from a case of old trachoma without inclusions. This organism corresponded morphologically with the previously described trachoma bodies.

Although outside the group of filterable viruses, mention may be made in this place of the successful cultivation of an organism from cases of Hodgkin's disease. In this country Bunting and Yates have cultivated a diphtheroid organism from 4 cases of this disease, which corresponds with the organism reported as having been obtained in 2 cases early this year by Negri and Mieremet. The organism is a non-acid-fast Gram-staining bacillus. It grows at body temperature and is a facultative anaërobe. Various media were used for its cultivation; Dorset's egg medium and glycerine-phosphate-agar proving valuable. The organism is extremely pleomorphic. On dry media long forms, banded, granular and club-shaped were observed. On moist media the organisms appear short and plump, and many forms are coccoid. The authors propose the name *Corynebacterium Hodgkini* for this organism.

DIAGNOSTIC AND THERAPEUTIC NOTES.

MEDICATION THROUGH A TRACHEAL FISTULA.—Rosenthal (*Archiv. gén. de méd.*, July, 1913). Intratracheal medication, as hitherto practised, is attended by a number of difficulties. If the injection is through the larynx, the latter must be anesthetized and the laryngeal cannula manipulated daily by a skilled laryngologist. This manipulation, moreover, is nearly impossible in very feeble or very young patients. If the medicament is injected directly into the trachea by means of a syringe armed with a long needle, the point of the latter is very apt to injure the posterior wall of the trachea, and any restlessness on the part of the patient is apt to prove decidedly embarrassing to the operator.

These difficulties, Rosenthal believes, are obviated by his new method. This consists in the use of a very fine cannula, having the shape and size of the ordinary tracheotomy tube, but an external diameter of only 2 to 4 mm. This tube is inserted into the trachea, either by means of a simplified tracheotomy operation or, if preferred, by thrusting the cannula, armed with a trocar, directly through the skin into the lumen of the trachea. The cannula is fastened in place in the usual manner and, when not in use, is kept sealed by a blunt mandrin. It produces no irritation or discomfort and does not interfere with cough or expectoration. The writer advocates the introduction, through the cannula, of large doses of antiseptics (best in olive oil as a vehicle) in nearly all severe pulmonary infections. He uses chiefly gomenol, a French proprietary antiseptic, or thicol, the indications for these being bronchopneumonia, pulmonary gangrene or abscess and pulmonary tuberculosis. In the last condition, cyanide of gold may be used, and solutions of bile salts in lobar pneumonia.

In the course of his experiments he found that the power of the pulmonary epithelium to absorb liquids, and especially oils, is nearly unlimited; 100 grm. of oil are absorbed cleanly and rapidly. As this represents some 900 calories, it is not to be despised as food. Cream, albuminous fluids and the like are tolerated equally well. Patients may thus apparently be supported for days at a time by means of intrapulmonic alimentation. In cases of gastro-intestinal ulceration in which it is desired to put this tract completely at rest, pulmonic feeding would seem to be at least as rational as rectal feeding. Obviously the entire procedure must be conducted with scrupulous asepsis.

THE TREATMENT OF ACUTE PLEURITIC EMPYEMA.—Hahn (*Deutsch. med. Wochenschr.*, No. 38, 1913). The proper treatment of chronic empyema is unquestionably surgical. In acute empyema, opinions differ in this matter. The disadvantages of rib resections are obvious. The operation in children requires a general anesthetic; in adults, with local

anesthesia, the shock may be no trifle; the sudden change in intrathoracic pressure may prove fatal; the resulting pneumothorax involves a great additional burden upon the weakened heart. In the Magdeburg-Sudenburg Hospital, satisfactory results have followed a less radical method. A trocar is thrust through an intercostal space, the mandrin withdrawn and immediately replaced by a Nelaton catheter. The latter is clamped and the metal cannula withdrawn over it, leaving only the catheter in place. The pus is first withdrawn very slowly and the free end of the catheter then kept permanently connected with a flask from which the air is kept partially exhausted. In this way a constant aspiration is kept up and the lung on the affected side kept distended. The results in 25 cases were very satisfactory, complete healing occurring, on the average, more rapidly than after resection. If the discharge persists for more than six weeks, or if there is reason to infer the presence of a number of encapsulated empyemas, surgical interference is indicated.

THE COMBINED ACTION OF MEDICAMENTS IN CARDIAC AND RENAL DROPSY.—Strauss (*Therap. Monatsbl.*, No. 2, 1913). Cases of cardiac or renal dropsy, in which digitalis, calomel or diuretin have proved unavailing, often, in the writer's experience, respond to a mixture of various diuretics and cardiac tonics. He is accustomed to prescribe:—

R	Inf. e fol. digital. titr.....	1.0
	Bulb. scill.	5.0
	cum Aq. destillat.....	150.0
	Euphyllin	
	Tr. strophanthi aa.....	2.5
	Sparteïn. sulf.	0.1
	Tr. opii simpl.	1.0
	Mucilag. gum. arab. ad.	180.0
M. D. S.		
	Twice daily two tablespoonfuls in an enema.	

A NEW TEST FOR ARTERIOSCLEROSIS.—Hertzell (*Berl. klin. Wochenschr.*, No. 6, 1913). The patient is made to lie quietly in bed and, by means of pneumatic cuffs such as are used in sphygmomanometry, the circulation is completely shut off in one arm and both legs. This is invariably followed by a rise in blood-pressure as registered in the free arm. Normally, this rise in arterial pressure is in the neighborhood of 5 mm. Hg. In cases of arteriosclerosis, however, the rise may amount to 60 mm. or more. The explanation of this abnormal rise may be found in the fact that one of the first results of arteriosclerosis is the loss on the part of the arteries of the power to dilate promptly when external causes bring about an increase of the peripheral resistance. The result under these circumstances must be a sharp rise of the blood-pressure. The writer believes that, whenever this reaction is positive, we may infer a pathological change in the arteries in the direction of greater rigidity. Such patients should be very carefully handled, especially when we have occasion to use hydro-therapeutic procedures.

DIAGNOSIS OF PERICARDITIS.—Thomayer (*Zentralbl. fuer Herz-und Gefässkrankh.*, Nos. 12, 14, 1913). The diagnosis of dry pericarditis is usually based upon the presence of the typical to and fro friction rub; occasionally, however, the latter is inaudible when the patient is lying in bed. In such cases, it can often be distinctly heard if the patient is made to sit up. Even after a considerable amount of exudate has been formed, this manoeuvre will again bring the rub out clearly.

The presence of pericardial effusions may be suspected if the breath sounds beneath the left clavicle are faint, when the patient is lying down, but become noticeably louder if he is made to sit up. This sign is especially valuable in cases of small pericardial effusion in which the distended pericardium does not lie close to the chest wall, and hence cannot be made out by means of percussion.

THE DIETETIC TREATMENT OF URTICARIA.—Salomon (*Wien. klin. Wochenschr.*, No. 35, 1913). The two articles of diet that should especially be avoided in urticaria are proteids and leguminous vegetables (peas, beans and the like). The patient should receive tea or coffee with much sugar, bouillon, lemon juice, grape juice, coarse bread with plenty of butter, rice, farina, cereals, lettuce, potatoes, raw and stewed fruit. The dietary should be made adequately nutritious by means of a plentiful supply of sugar and butter.

ADRENALIN IN BRONCHIAL ASTHMA.—Weijer (*Tydschr. v. Geneesk.*, No. 6, 1913). The hypodermic injection of 0.5 c.cm. of a 1 to 1000 solution of adrenalin is followed by an almost immediate cessation of the asthmatic attack.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

With the opening of the autumn session, so many papers of varying importance, and so many addresses of interest have been read and delivered that the task of your correspondent is hampered in its fulfilment by a veritable *embarras du choix*.

Last week, Sir William Osler, from the stores of his ripe experience, gave us, at the Royal Society of Medicine, an interesting communication on Congenital Syphilis of the Liver, averring that there is a group of cases of this condition in which splenomegaly and anemia are so predominant, that the hepatic lesion is overlooked and a diagnosis of Banti's disease made. A similar clinical picture may also be presented by acquired syphilis. The term 'Banti's disease' should be reserved for a group of cases in which the hepatic condition is secondary to progressive enlargement of the spleen, associated with recurrent attacks of anemia and with repeated hemorrhages from the stomach and bowel. In the course of discussion, Dr. Robert Hutchison pointed out that a very similar condition of affairs is met with in what is now known as the metasplenomegalic type of hypertrophic (biliary) cirrhosis of the liver, or Hanot's disease.

These liver and spleen conditions are, indeed, becoming bewildering in their resemblances and differences.

A case that I had the advantage of seeing recently, with a colleague, Mr. Sidney Boyd, under whose charge the patient was, well illustrates some of the difficulties in diagnosis that are now met with. The lad, who had been ill with jaundice of an acholuric type for several years, had already been fruitlessly explored in his gall-bladder region, when he came under Mr. Boyd's observation. Moderate splenomegaly was present, with jaundice, but with no bilirubin in the urine and with bile in the stools. A blood examination revealed no undue fragility of the red cells, but showed that the blood hemolysed itself on standing. A Wassermann test gave a positive result. Splenectomy was successfully performed; and the lad is now quite well and has lost his jaundice. The Wassermann reaction is negative and the blood no longer hemolyses on standing. No antisyphilitic remedy has been administered.

Examination of the spleen shows thickening of the capsule, with all the signs of a commencing and irritative chronic inflammation. This case can be descriptively labelled as one of acquired acholuric and hemolytic jaundice, without Chauffard's fragility, and with splenomegaly.

Fortunately, the lad seems to be cured of his ills. But, had he not been operated on, what would have been the prospect?

Has he, perchance, already some of the changes of Hanot's cirrhosis, and should his case be called one of metasplenomegalic hypertrophic cirrhosis? Or is the condition really more akin to that called Banti's disease? Time perhaps will show.

There is no need to suppose the slightest influence of syphilis in the case, and, of course, it is now well known that a positive Wassermann reaction, when there is jaundice, is not necessarily indicative of lues.

Following the discussion of Sir William Osler's paper, Dr. Gibson, of Oxford, demonstrated the presence, in certain spleens removed from the subjects of Banti's disease, of tiny pigmented areas, which, on section, and after appropriate staining, appear to reveal felted masses of streptothrix filaments. Dr. Gibson's specimens seemed most convincing, and it is to be hoped that further research will confirm his findings, in some, if not in all such cases. On the same evening a case, not very convincing perhaps, but still one that has been accepted by the experts, was shown as an example of pellagra. We are all—dermatologists, neurologists and alienists—nowadays on the qui vive to detect cases of pellagra in England, and there seems little doubt that we have been seeing and treating such for many years, in the same way that M. Jourdain spoke prose—without knowing it.

If the occurrence of pellagra in England on at all a widespread scale is acknowledged, probably the death blow will have been given to the 'maize theory.' For, so far as I am aware, not one of the persons who have been in the last few months reported as pellagrins over here have been even casual consumers of Indian corn—unless, again, like M. Jourdain, without knowing it.

Dr. Mercier, whose incisive, if not mordant, contributions to discussion are so widely appreciated, last week read before the Section of Psychiatry of the Royal Society a witty and whimsical, though relentlessly logical paper, in which he propounded the question, What is Insanity?

Dr. Mercier's plea for clear and accurate thinking ought to be endorsed by all; yet one fears that human perversity is such that few will agree with him that we really should decide whether, when we speak of insanity, we have in mind a conception of disorder of mind alone, or of disorder of mind and conduct, or of disorder of mind, conduct, brain function, and possibly of metabolism. The fact is, that as was said, insanity is symptomatic when it is only a part of the whole of the correlated disorders of function from which the patient suffers, and is not a disease, unless it is the whole of the correlated disorders in any given case.

Symptomatic insanity, in Dr. Mercier's view, should be considered as delirium, and the term 'insanity' restricted to those cases in which it is, in the Mercierian sense, a disease. Dr. Mercier's thesis that, without disorder of conduct there is no insanity, has always seemed to me irrefragable, but it is not popular, because I suppose we like to think of insanity as what people call an 'entity.' Certainly, unless disorder of conduct obtains, certification of a person as insane is difficult. In this connection I am reminded of a man I saw many years ago, who had once been in an asylum, and who came up to his doctor, declaring he was again insane, and wanted to go to the asylum. That his wish was a very proper one, no one could deny. But how was he to be certified?

Was his recognition of his inner disorder of mind a sane or an insane process? He had no delusions, and, but for the fact that he wanted to

go to the asylum, did not differ from his fellow-men in conduct. However, while magisterial and medical deliberations were proceeding—this was in the very heart of a remote rural district—the patient solved the difficulty by passing into a state of acute mania.

But his case has always seemed to me to present a logical difficulty, and I am not sure how even Dr. Mercier would solve the riddle.

November 10th.

THE WOMEN OF GREECE OF THE PRESENT TIME.

By A. ROSE, M. D., of New York.

Kalos in Greek was at first the word for beautiful; but since the ancient Greeks thought that everything beautiful was good, this word Kalos became a synonym for beautiful and good, and now Kalos means good.

In the sense that beautiful and good are one and the same, Emanuel Kant has spoken of women as the representatives of beauty; and in this sense the writer will speak of the Greek women of to-day, as the ideals of beauty.

It was a brilliant, a joyful day, when, in the year 1886, the Arsakeion of Athens celebrated its fiftieth anniversary. It was a feast worthy of the Hellenic nation, the most memorable since Greece had regained her independence, a feast which reminded the present generation of the noble spirit and the virtue of their nearest ancestors.

When a part—a part only—of Greece had regained freedom, after having suffered for almost four hundred years in Turkish slavery, one of the first things to which the people devoted themselves was public instruction.

John Kokonis, a prominent paedagogue, held the opinion that the state of civilization and the power of a nation before all were dependent on the influence of the mothers upon their children, because the children received their first education from the mothers, and because the influence of mothers in society produced great and good results; further, he held that the position of woman was one of the most important indications by which the national character and the state of civilization of a people could be judged. For these reasons Kokonis proclaimed that in Greece, where higher schools for boys had already been established, higher schools for girls were needed immediately, because it would be unjust to deny to women the same standard of education which was accorded to men. The income of the Greek government at that time was so small that funds for such schools could not be expected from this quarter.

The little Greek nation had made tremendous sacrifices during a war of seven years, had fought until her land had been devastated and her race decimated. The sword, famine, and disease had reduced the population to about one-third its original number, and this third to a state of most complete destitution. There has been no war in modern times in which an equal loss of life and property has been sustained by any people, who, despite this suffering, have remained unsubdued.

From 1825 to 1832 Greece was deprived of all internal revenue. Her

commerce was completely annihilated. Even with the immense supplies which Greece received from the Philhellenic committees of Europe and America, the revolution seemed not infrequently to be in danger of collapse from actual starvation of the whole population. All agricultural stock was extirpated; houses, barns, and stables were destroyed, fruit trees and vineyards rooted up.

It was shortly after this cruel war had ended that, at the instigation of Kokonis, there came together in Athens, on July 25th, 1836, seventy-two men, whose purpose was to found an institution in which girls should be educated to teach in schools throughout Greece, even in the out-of-the-way villages.

The money to execute this plan was raised by public subscription. The appeal, directed to the love of Greeks for knowledge, was received with joy by all Greeks, by those in the liberated fatherland, those who still suffered in Turkish bondage, the Greeks living in foreign lands—all gave to their ability.

The constitution of this Educational Society, as it was called at first, forms a bright page in the history of Greece, and has proved a blessing not only for the little Greek kingdom, but wherever Greek hearts are beating, wherever the Greek language is spoken.

What success the Educational Society has had can be seen from the words of a French writer published about thirty years ago: "There no more exists a mountain without a valley than a Greek village without a school."

In the first school year, the year 1837, the society commenced its work with a capital of 5,000 drachmas (\$1,000.00); in the year 1886 it had a budget of 300,000 drachmas. During the first school year the number of pupils was seventy; in the year 1886, two thousand.

In the first three years a house was rented, every succeeding year a larger one, and when after the third year there was no house in Athens large enough to accommodate the now much increased number of pupils, the erection of a school building was decided upon.

The Society kept on building so long as the means lasted. The timber was presented by a Greek in Roumania, and a ship of the Greek government brought it to Athens. When the funds were exhausted and the society had to discontinue the work of erecting a school-house, there appeared on the scene a man who provided the means to finish the building.

This man was a physician, his name Apostolis Arsakis, from Epirus, a part of Greece which, until the glorious victories of the Greeks in the recent war of the Balkan States, has been suffering under Turkish bondage. The idea promulgated by Kokonis found an echo in his soul. He gave 250,000 drachmas to finish the school-house, and paid back to the Educational Society all the money it had already expended on the building—namely, 100,000 drachmas. Then he deposited 200,000 drachmas in the National Bank of Greece, with the condition that the interest of this capital should be applied towards maintaining the school.

When the house was finished the Educational Society decided that the institution should for all time bear the name of Arsakis, and the word *Arsakeion* was written in golden letters on a white marble tablet placed over the large entrance. He also gave funds for a school for girls in Epirus, a school to be under the control of the *Arsakeion*.

Not only Arsakis, but many others have contributed to enrich the institution. The names of those who have given most generously are written

on marble columns which stand in the magnificent hall of the entrance. Among those we find the names of some Philhellenes: Carning, Eynard and the Duke of Montpensier.

During the first fifty years of its existence more than two thousand teachers have received their diplomas in the Arsakeion, and they have taught and teach in every city and every village of Greece, and in many places of the Orient where Greeks are living, as well as in French and English cities.

In the year 1872 there was organized, under the inspiration and protection of Queen Olga, the Society for the Improvement of the State of Women of the Working Class. The Ergasterion of this society is the great workshop for artistic handwork. Over four hundred industrious women find steady occupation there. It is not a factory owned by some mercantile firm, but the workshop of the society, founded and sustained in the interest and for the benefit of Greek women of the working class. Silk fabrics are woven there that surpass the best French work; some of them interwoven with gold thread are finer than can be found anywhere else. The women work in airy, bright rooms with high ceilings, the windows open, under the instruction and guidance of their friends—the aristocratic ladies of Athens. All is handwork, nothing machine-made. Here we see Oriental patterns in carpets.

The Ergasterion is the center for women's work throughout Greece. Gold embroideries on silk and velvet, such as are made in Euboea, in Epirus and on some of the islands of the Aegean Sea, and sent to the Ergasterion of Athens, are products of taste that have been evolved and transmitted through centuries; their equals cannot be found in any Parisian shop. From the Ergasterion of Athens the peasant women in the provinces are supplied with artistic patterns, their taste is educated and its purity maintained, and advice is given on many subjects to the women in the country who work for the Ergasterion.

Among the objects of the society from its start has been that of elevating the status of women nurses to one of dignity, which previously had not been accorded to them. Nursing the sick as an occupation was practiced by women of the humblest classes, and they were not considered higher than washerwomen; there existed at that time among the ordinary people no idea that nursing the sick was a noble vocation worthy of well-educated, well-trained women.

In the year 1875 Queen Olga requested Dr. Nicolas G. Makkas to write a textbook for the instruction of nurses. In the following year the Queen appointed a committee of distinguished men to collect money for the erection of a new hospital to equal the best modern hospitals of Europe. This hospital was opened in the year 1884 and was called Evangelismos.

It is to a great extent due to the warm interest and the personal devotion of Queen Olga that the contributions to this hospital from the beginning came in so richly and continued to flow all the time, but the truth is that there exists no place on earth, no city in the world, which is, in proportion to its size, so generous as Athens in the matter of philanthropy.

In speaking of the site, the Evangelismos is the most wholesome, most beautifully situated hospital that can be imagined. It stands on high ground, with a magnificent view on a scene dominated by picturesque mountains and a scenery which is dear to everyone who is familiar with ancient Greek history. There is a current of air from the mountains of the north, modified sometimes by sea breezes, which were highly appreciated by the ancients. It is on account of this fresh mountain air that

the Americans and the English have selected the places for their archaeological schools in the neighborhood of the Evangelismos. It is well known that on account of the purity of the air in Greece, especially in Athens, septic diseases are of rare occurrence and of little danger. Erysipelas, for instance, is considered a harmless affection.

As has been mentioned already, it was Queen Olga, now the Queen-widow, who inspired and still inspires the work, but, unlike instances of this kind in which patronage by a high personage means principally receiving reports, contributing means, we have here an example of devotion without equal. The interest which the Queen takes in the welfare of the hospital is admirable indeed. While in Athens she takes personal notice of the most minute details, visits the hospital daily, goes to the bedsides, consoles the suffering. And through the daily press we know how indefatigable she and the princesses of the royal family have worked for the wounded during the last war.

Visiting the different hospitals of Patras and Athens, there was one thing which surprised me especially—the high standard of education and refinement of the nurses in general. It is true there were many German, Danish and Americans among them, but as a rule they spoke, besides Greek and their mother tongues, several languages; all the native Greek nurses, as far as I experienced, spoke German and told me that they had learned it in school.

The details enumerated here tell of the nobility of Greek women of all classes, and it may truly be said that there is no nation by which women are higher respected than by the Greek. This fact alone argues a great future for the Greeks. Ever since I began to try to enlighten the medical profession on the true character of the Greek people, I predicted that the greatness of Greece will not only remain to be a thing of the past, of the glorious classical period, but it will be also in a glorious future.

November 10th.

BOOK REVIEWS.

THE SURGICAL CLINICS OF JOHN B. MURPHY, M. D., AT MERCY HOSPITAL, CHICAGO. August, 1913. Volume II, Number 4. Published Bi-Monthly. Philadelphia: W. B. Saunders Company. 1913. Price, \$8.00 per year.

What we have said in the past, concerning the Murphy "Clinics," holds true of this volume also. There is a wealth of clinical acumen, of logically developed reasoning, and of inductive thought that is little short of fascinating.

There is an opening chapter on vaccine and serum therapy by Dr. Philip Kreuscher that states clearly and succinctly the present status of the serum and vaccine question. To the reviewer, the matter of introducing such chapters is hardly in line with good policy. One naturally seeks in the Murphy "Clinics" for the teachings of Murphy. It seems to us that papers delivered by other men, before the Chicago Medical Society, should be published in some current medical journal.

The following clinical material is carefully analyzed: Urethrorrectal fistula, laminectomy, backward dislocation of the knee, fracture of the femur, carcinoma of the breast, tumor of the radius, ankylosis of the knee, postsacral dermoid, ankylosis of the jaw, vesical calculus, ascites, myeloma of the cord, glioma of the cerebellum, transplantation of bone for fractured tibia, and an excellent set of plates demonstrating the circulation around the various large joints.

MANUAL OF OBSTETRICS. By John Osborn Polak, M. Sc., M. D., Professor of Obstetrics and Gynecology in the Long Island College Hospital, etc. etc. With Three Color Plates and One Hundred and Nineteen Illustrations in Text. New York and London: D. Appleton and Company. 1913.

The ever-increasing size of the regular textbooks creates in obstetrics, just as in other specialties, a distinct demand for a shorter manual to be used by the junior student who is forced to familiarize himself with essential facts in order to appreciate details when first facing them as senior in practical work. It is undeniably a difficult task to select these essentials, to present them briefly but still intelligibly, not to omit what is important, and not to dwell at too great length on what is not important. In general, this manual is rather satisfactory, but can hardly be pronounced well balanced or ideal. The chapter entitled Organology contains a great deal that is of no interest and of no importance to the student of obstetrics, while, *e. g.*, the fact that no mention is made of the embryology of twin pregnancy and nothing is said about twin placenta, etc. is a defect that can easily be corrected in the next edition.

A MANUAL OF IMMUNITY. For Students and Practitioners. By Elizabeth T. Fraser, M. D. (Glas.), Late Assistant Bacteriologist, Glasgow Royal Infirmary, Glasgow: James Maclehose and Sons. 1912. Price, 5 s.

The day has passed when the subject of immunity and its related problems could be relegated to the laboratory. It is indispensable that the practitioner of medicine have a knowledge of the fundamentals of this branch of the science, so that he may be able to interpret properly, not only the diagnostic information of the laboratory, but also the significance of many of his own therapeutic efforts. To give to the doctor, unused to the technical details of the laboratory, this knowledge in language of the every-day life is the purpose of this little book. Antitoxins, opsonins, complement, hemolysin, Widal's reaction, Wassermann's test, etc. are included among the subjects which make the work one of the most valuable for the busy doctor that has come to the reviewer's office.

THE MEDICAL RECORD VISITING LIST OR PHYSICIANS' DIARY FOR 1914. Newly Revised. New York: William Wood and Company. 1914. Price, \$1.50.

Each year adds value to this visiting list. The edition for 1914 is arranged in the customary way for the convenient registration of all the work done by the physician. It is an excellent and most handy little book and can heartily be recommended to every physician as a necessity in his daily routine work.

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